NETWORK WORLD
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Brent Taylor of Georgia Power
ALAN WEINER

Users part ways on road to SNA/LAN integration

First in a four-part series.

BY MAUREEN MOLLOY

There's been a lot of talk about routers supporting IBM SNA traffic but until now, precious little action.

Routers are being equipped with advanced features that ensure the integrity of critical Systems Network Architecture data on internet highways. As a result, more users are evaluating routing technology's potential to generate significant cost savings by wiping out the need for parallel SNA- and router-based backbones (see graphic, page 51).

This series will examine the strategies users are adopting to achieve SNA/LAN internet integration.

Some have embraced a conversion technique that merges data from older SNA devices with LAN traffic for bridging across a multiprotocol internet. Users can also encapsulate token ring-based SNA data in Transmission Control Protocol/Internet Protocol packets and carry it with other local-area network traffic across the same wide-area link. The opposite approach is to employ

See **Integration,** *page 51*

GROUP SCHEDULING

Calendar wares set to debut

BY BOB BROWN

There are some red-letter days ahead for group scheduling products.

Market leader Powercore, Inc. next week will unwrap a new edition of its product that supports Apple Computer, Inc. Macintosh clients, integration with additional electronic mail systems and new administrative tools. The product will debut at the GroupWare '93 conference in San Jose, Calif.

Lotus Development Corp. will also use the show to unveil a networked version of its Lotus Organizer software with support for the Vendor Independent Messaging (VIM) specification, which will enable it to work with cc:Mail, Lotus Notes and other VIM-compliant mail systems. This week, WordPerfect Corp. will announce a gateway designed to let users pass scheduling information between WordPerfect Office and IBM's OfficeVision/VM.

For its part, Southfield, Mich.-based Campbell Services, Inc. said it will re-

See **Calendar,** *page 50*

NEWSPAPER
100

IBM APPN wares may put FEPs on the ropes

BY MICHAEL COONEY

Raleigh, N.C.

New additions IBM will make to its APPN portfolio over the next few months could bring down the curtain on the venerable front-end processor (FEP).

IBM plans to add Advanced Peer-to-Peer Networking Network Node (NN) support to its IBM 3172 Interconnect Controller, giving users a simpler and less expensive alternative to the FEP for connecting local and remote devices to a mainframe. Additionally, APPN's 3270-dependent LU Requestor (dLUR) technology will be added to Communications Manager/2, the 6611 router and the 3172, thus enhancing support for 3270 traffic in APPN nets.

On top of all that, IBM will enhance the APPN implementations on all its platforms by adding APPN's High Performance Routing (HPR).

APPN is IBM's peer networking technology, and HPR is an extension that promises a three- to tenfold performance improvement through enhanced routing techniques.

"We are rounding out and expanding our APPN offerings to help large SNA enterprises move toward utilizing APPN and its improved performance and connectivity options," said Jane Munn, manager of IBM's networking architectures.

The 3172, which attaches local-area nets to mainframe channels, is the last major piece of IBM communications equipment to receive APPN support.

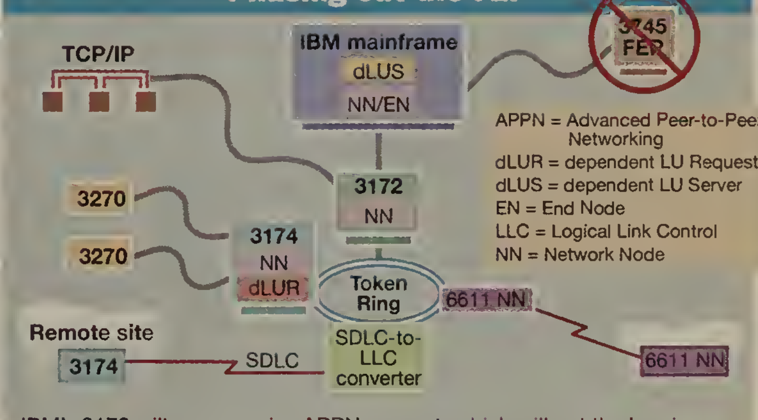
IBM admitted that an APPN-capable 3172 could replace the FEP in remote sites or small Systems Network Architecture shops but said its 3745 would still be strategic for large users.

See **Rollout,** *page 50*

DEC readies SNA routing plan

Digital Equipment Corp. is putting the finishing touches on its strategy for integrating DECnet and SNA traffic on LAN internets. Page 49.

Phasing out the FEP



APPN = Advanced Peer-to-Peer Networking
dLUR = dependent LU Requestor
dLUS = dependent LU Server
EN = End Node
LLC = Logical Link Control
NN = Network Node

IBM's 3172 will soon receive APPN support, which will put the box in a uniquely powerful position in Big Blue's APPN networking scheme, obviating the need for front-end processors (FEP) in many configurations.

GRAPHIC BY SUSAN SLATER SOURCE: *NETWORK WORLD*

Tiny devices pose big net challenges

BY FREDRIC PAUL

Boston

Apple Computer, Inc. next week will finally introduce its Newton personal digital assistant (PDA) at MacWorld Expo here, and network administrators had better brace themselves for some big changes.

If Newton, now dubbed MessagePad, turns out to be as big a success as Apple hopes, it will change the demographics of networking, adding hoards of new users — many of them unfamiliar with technology — that want remote access to corporate systems. As if having to deal with these new users won't be enough of a challenge, net managers will have to wrestle with

See **Challenges,** *page 49*

A 1-2-3 approach to client/server apps

Users adopt 3-tiered approach to new apps.

BY WAYNE ECKERSON

Minneapolis

As users begin pushing the boundaries of client/server computing, some are adopting a three-tiered approach to building distributed applications.

In this multilayered architecture, the presentation, logic and data management components of an application are divided into separate processes that can run on one or more platforms, depending on application or business requirements. In contrast, most client/server applications couple application logic with front-end interfaces or back-end databases.

Case in point: United Behavioral Systems, Inc. (UBS), a provider of mental health and substance abuse services here, has begun rolling out to more than 30 offices nationwide a series of distributed applications based on a three-tiered architecture.

According to Wayne Schmidt, systems development manager at UBS, the three-tiered architecture makes it easier to add, maintain and expand applications as the company grows and changes, as well as to integrate new applications with legacy systems.

"The three-tiered approach offers more scalability and robustness than a two-tiered client/server architecture and sets us up better for the future," Schmidt said.

UBS' three-tiered architecture consists of a graphical user interface (GUI) built with Powersoft Corp.'s PowerBuilder, blocks of C subroutines or "functionality servers" running on a centralized IBM RISC Sys-

See **1-2-3 approach,** *page 51*

Briefs

Bell Labs' laser fastest yet. AT&T Bell Laboratories last week said it has developed the world's fastest telecommunications lasers, capable of transmitting data at 30G to 40G bit/sec. Bell Labs' single-mode laser that emits a single wavelength of light and turns on and off 22.5 billion times a second. The previous maximum speed for such lasers was 16 to 18 billion cycles per second. Bell Labs also developed a multimode laser that emits light over several wavelengths. It operates at 25 billion cycles a second, up from the previous maximum of 24 billion cycles per second.

Vote delayed on IBM ATM proposals. Saying more work needs to be done, the ATM Forum last week decided to pass on final approval of IBM-proposed Asynchronous Transfer Mode (ATM) standards for local-area network access to ATM nets and low-speed ATM until the forum's next general meeting in September. IBM has proposed ATM adapter card technology that supports 25M bit/sec copper-wire links, along with technology that would let devices on token-ring, Ethernet or Fiber Distributed Data Interface LANs access ATM services.

MCI forms PCS consortium. MCI Communications Corp. last week announced a consortium comprising 150 firms that plans to offer personal communications services (PCS) across half the U.S. The consortium, which does not yet have a formal name, plans to file for a national PCS license from the Federal Communications Commission. Consortium members come from a diverse set of industries, including telecommunications, cable television and publishing.

MFS takes on Maryland PSC. Alternative access provider MFS Communications Company, Inc. last week filed a petition with the Maryland Public Service Commission (PSC) to open up the local exchange and intrastate interexchange markets to competition. MFS is asking the PSC to require interconnection of competing telephone networks with that of The Chesapeake & Potomac Telephone Co. of Maryland.

DEC loses networking visionary. William Johnson, the 20-year veteran of Digital Equipment Corp. who led the company's thrust into networking, is leaving DEC to pursue other opportunities. Johnson, DEC's vice president of corporate marketing, is the latest in a line of DEC executives who have departed following the ouster of company founder Kenneth Olsen last year. Johnson's departure comes after DEC named former IBM executive Edward Lucente vice president of sales and marketing in April. Johnson reported to Lucente.

NT is on its way. Microsoft Corp. last week released its Windows NT and Windows NT Advanced Server to its manufacturing operations and said both products will be available to consumers within three weeks for Intel X86 and MIPS R4400-based platforms. A version for Digital Equipment Corp.'s Alpha AXP is expected within 60 days.

IBM to announce downsizing efforts. At the Downsizing Expo this week in Santa Clara, Calif., IBM is planning to make an announcement related to supporting multimedia applications on the Application System/400. Separately, Zortec, Inc., a Nashville vendor of application development software, will announce immediate availability of its System Z application development tool and TranZform application conversion/migration tool on the IBM AS/400. The software is designed to help users downsize applications from mainframes to the AS/400 or to build from scratch client/server applications that use the AS/400 as a server.

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Network HELP desk

Network World tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Susan Collins at (800) 622-1108, via fax at (508) 820-3467 or via Internet at scollins@world.std.com.

My question involves print spooling in a Novell, Inc. NetWare 3.11 network. It appears that the print queue is stored on the SYS: volume and, therefore, requires that we grant all users unrestricted write access to SYS: volume. This means users could accidentally trash the SYS: volume. Can print jobs be spooled somewhere else?

Robert Ludka, Ft. Monroe, Va.

Ronald Nutter, escalation manager of 900 Support, a 24-hour, seven-day-a-week Novell technical support company in Lake Oswego, Ore., replies:

The print queues are stored on the SYS: volume under the system directory. In NetWare 3.11, this is where they have to reside; they cannot be located elsewhere.

You don't need to grant users unrestricted read/write access to the SYS: volume for printing. If you are restricting the amount of hard disk space that a user can occupy on SYS: volume, I would suggest you turn that option off in Syscom, since that could cause print spooling errors. I would also strongly recommend that you have a SYS: volume of at least 100M bytes or more to allow plenty of room to spool print jobs.

Our hospital has a number of databases linked via different methods. Our physicians would like to conduct research studies using these databases. Is there a way to provide a decision support system without actually duplicating all the information that's in the active database?

Sophia Malcolm, Atlanta

Paul Li, a manager at Ernst & Young's National Technology Services Organization in Vienna, Va., replies:

If your databases are a mixture of legacy systems (i.e., VSAM files) and relational database

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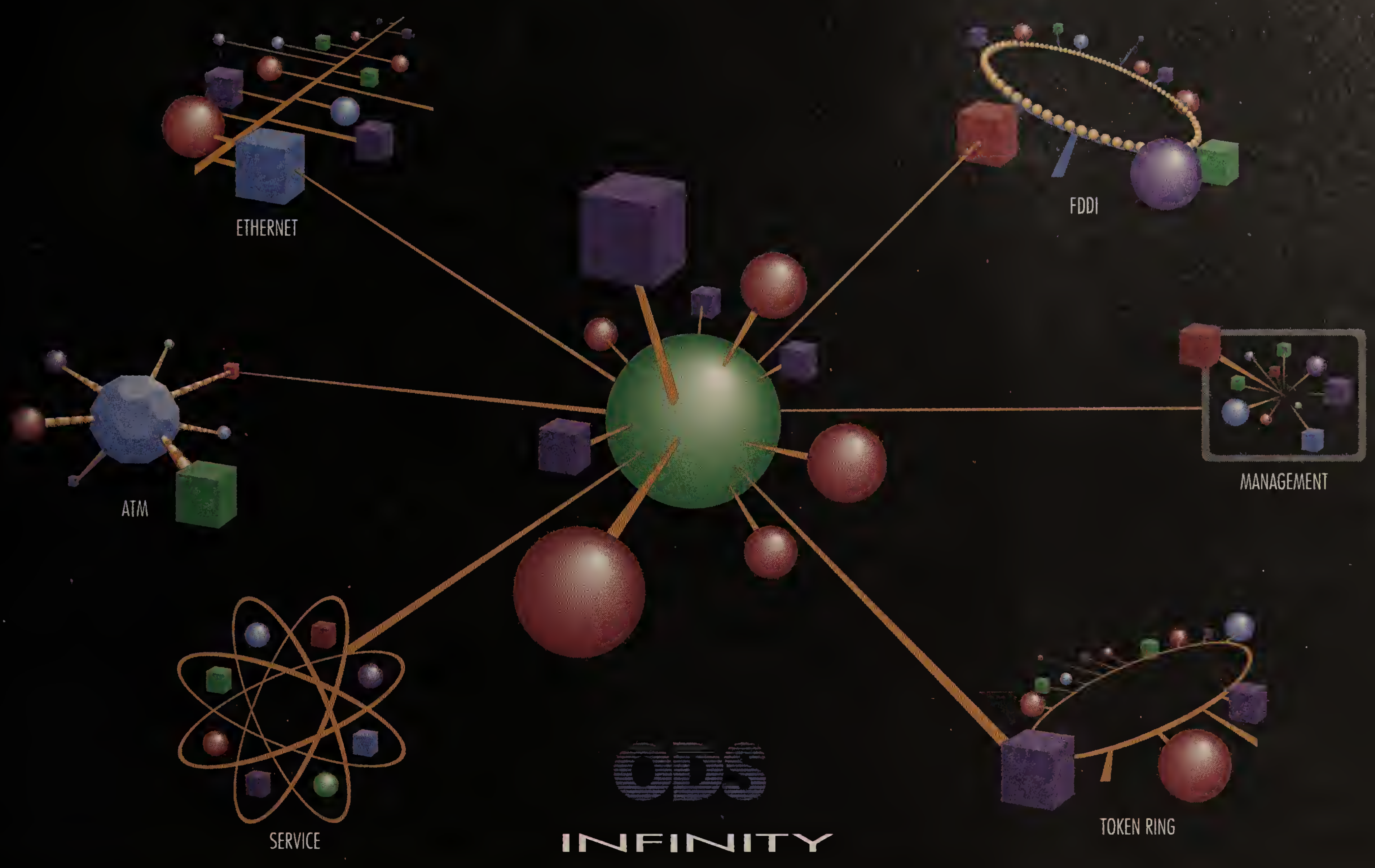

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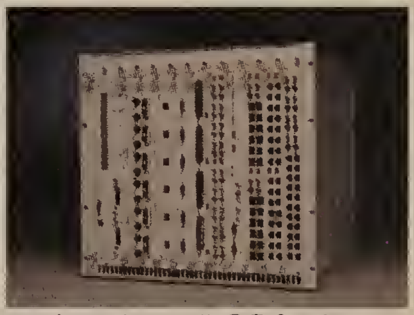

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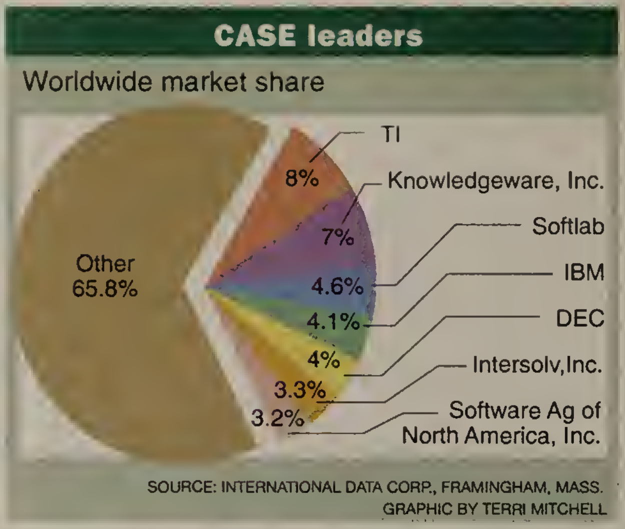
TI to unwrap new tools for building client/server apps

Will allow developers to split application logic.

BY WAYNE ECKERSON

Plano, Texas

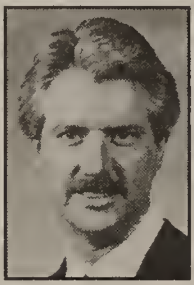


CASE leaders

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS. GRAPHIC BY TERRI MITCHELL

Jumping on the client/server bandwagon, Texas Instruments, Inc. this week will announce a version of its mainframe-based computer-aided software engineering (CASE) tool that lets developers split application logic between servers and clients.

Information Engineering Facility (IEF) for Client/Server, due to ship next month, helps developers generate graphical applications that run cooperatively on OS/2 or Windows clients and IBM MVS, Hewlett-Packard Co. HP-UX or IBM AIX servers.



McCLAIN

Most client/server development tools enable developers to place logic on either the client or the server but not divide the logic between platforms, TI officials said. This provides greater flexibility for developers to optimize client/server applications for performance and meet changing business requirements.

IEF for Client/Server provides 35 screens that help users model applications using information engineering or rapid application development methodologies. The tool automatically generates all application and communications code, and lets users decide how best to split the code between client and server platforms.

"Our goal has been to allow developers to build client/server applications without having to learn new skill sets," said Duncan McClain, director of marketing at the Advanced Information Management Division of TI in Plano, Texas. "IEF insulates developers from the complexities of distributing applications across a network."

While TI is moving somewhat belatedly into the client/server arena, it is betting that users will begin turning to higher level CASE tools to support client/server development efforts on an enterprisewide scale.

Some analysts and users contend that popular client/server tools, such as Powersoft Corp.'s PowerBuilder and Gupta Corp.'s SQLWindows, are good for building departmental applications but lack the robustness to support complex, mission-critical applications.

TI's IEF for Client/Server consists of development and production platforms. The development environment comprises Developer Workstation software that runs on OS/2, Windows 3.1 or HP-UX platforms and an Encyclopedia for storing specifications and code. The Encyclopedia, which works as a central or distributed repository, runs on OS/2, HP-UX or Digital Equipment Corp. VMS platforms.

Applications built using the Developer Workstation can run on any combination of OS/2 or Windows 3.1 clients and IBM MVS, HP-UX and IBM AIX servers. Future support is planned for Motif clients, additional Unix platforms, DEC's VMS, Tandem Computers, Inc.'s Guardian and Microsoft Corp.'s Windows NT.

IEF for Client/Server also lets users build applications in which OS/2 or Windows client applications can access data on remote databases, including IBM's Database Manager and DB2, Oracle Corp.'s Oracle7 and Sybase, Inc.'s and Microsoft's SQL Server.

IEF for Client/Server requires users to implement an OS/2 gateway running a piece of IEF software called the Transport Bridge, which supports communications between clients running on Network Basic I/O System local-area networks and servers. The gateway links clients to Unix servers via Transmission Control Protocol/Internet Protocol and IBM MVS servers via LU 6.2.

Beta user Kevin Ladwig, systems engineer at Electronic Data Systems Corp. here, said, "Few tools let you split logic between clients and servers as easily as IEF does."

He added, however, that the Windows screens IEF for Client/Server generates still have "a 3270 mentality." He would like IEF icons or fields to automatically kick off transactions or have embedded script files, capabilities that are currently missing.

Pricing for a Developer Workstation starts at $11,000. An Encyclopedia or repository starts at $20,000 and has extra charges for each connected workstation. TI charges no run-time fees.

☎TI: (800) 336-5236.

3Com to roll out Fast Ethernet products across its entire line

BY SKIP MACASKILL

Santa Clara, Calif.

3Com Corp. this week will announce plans to roll out a suite of 100M bit/sec Ethernet products by mid-1994 that will span its entire product portfolio, from adapter cards to chassis-based hubs and bridge/ routers.

The company decided to move forward with its product plans in the wake of the IEEE 802 executive committee's decision to move the 3Com-backed Fast Ethernet proposal to project status — which all but ensures 3Com's technology will be at the heart of a draft standard.

"Basically, we're putting a stake in the ground and making a commitment to this technology by rolling it out across the board," said George Prodan, product-line manager at 3Com.

3Com's implementation of this emerging technology, which was backed by a slew of other networking vendors, keeps Ethernet's carrier-sense multiple access with collision detection media access control-layer intact. An alternative proposal led by Hewlett-Packard Co. and AT&T was also moved to project status but uses a proprietary signaling scheme instead of CSMA/CD.

Since both proposals are likely to be finalized as standards for 100M bit/sec Ethernet, users will have to choose between the two when implementing the technology in their nets.

The 3Com product line will include a family of Ethernet 10/100 network interface cards (NIC) that will be software driver-compatible with 3Com's existing EtherLink III NICs.

The 10/100 line will be software selectable for either 10M or 100M bit/sec Ethernet and feature 3Com's Parallel Tasking technology, which speeds data transfers by allowing separate tasks to be performed simultaneously.

The cards will be available in the most popular bus configurations and support Category 3, 4 and 5 unshielded twisted-pair wiring, as well as Type 1 shielded twisted-pair and fiber-optic connections.

3Com will also roll out a series of hubs supporting the technology, with a stand-alone, stackable hub as the initial release. The company will then develop hub modules supporting 100M bit/sec Ethernet for its chassis-based hub lines.

The final piece of the end-to-end strategy area will be 100M bit/sec Ethernet interfaces for its NetBuilder II bridge/router line.

"Users will likely deploy the technology initially in clusters of servers or workstations where high-performance is needed, which creates the need for the smaller, stackable hub in early implementations," Prodan said.

According to Doug Spreng, vice president and general manager of 3Com's Network Adapter Division, users will likely need the confidence of a draft standard before making a decision to employ the technology. While unsure of when such a standard will materialize, he said the work is well under way.

Because 3Com is using Ethernet's CSMA/CD and can offer compatible products from the adapter out to the wide area, it has an opportunity to make an initial impact on the emerging market, said Charlie Robbins, director of communications research at Aberdeen Group, Inc., a consultancy in Boston.

"3Com already has the adapter expertise, so it can develop the Fast Ethernet technology cheaper and more aggressively than others," he said.

☎3Com: (800) 638-3266.

MCI claims to be the big winner under Fresh Look

BY BILL BURCH

Washington, D.C.

In the three-month battle to win toll-free customers from AT&T under the Federal Communications Commission's Fresh Look program, MCI Communications Corp. last week declared itself the winner, claiming it took $1 billion in business away from AT&T.

During Fresh Look, which ended July 29, MCI said it signed $500 million dollars' worth of contracts with companies that left AT&T. The carrier claimed it will get another $500 million from companies that plan to use both carriers but have agreed to give MCI more business at AT&T's expense.

"We opened new doors at many of AT&T's historically most loyal customers," said MCI President Daniel Akerson. On top of the $1 billion already signed, Akerson said a number of AT&T users are still weighing the switch. He predicted another $300 million in new business will cross over in the next month or two. Overall, MCI lured customers away from other carriers at more than three times the rate it lost them, MCI said. Among those that switched outright from AT&T to MCI were Boise Cascade Corp., Ceridian Corp., Courtaulds Coatings, Inc. and James River Corp.

During the FCC's Fresh Look period, customers could sign new contracts for network services that included 800 offerings. Thanks to 800 portability, users could switch carriers without losing their original 800 numbers. "AT&T had to aggressively reprice their tariff offerings in order to hold their customers," said Jonathan Crane, president of MCI's national accounts unit. "They wouldn't have had to do that if they were able to maintain an added value over MCI."

Responding to MCI's boasts, AT&T said it is preparing its own figures on the Fresh Look period.

"Our actual numbers to date are completely at odds with MCI's claims," AT&T stated. "In fact, customers who are eligible for Fresh Look are overwhelmingly choosing to stay with AT&T." AT&T promised to release a report next week with figures that support its counterclaims, including the actual number of AT&T customers eligible for Fresh Look and the number that have moved to another carrier.

MCI's Crane said the number of customers is not important; what counts are the revenue gains that will show up in changes in minutes of use and a rebalancing of business between competing services.

Hank Levine, an attorney with Levine, Lapaga and Bloch in Washington, D.C., said any shift of customers between carriers was overshadowed by the market's overall growth.

For its part, AT&T lost only a smidgen of the high-end business covered by Fresh Look, Levine said. The carrier started out with about an 80% market share and wound up with around 78%, he estimated.

Fresh Look's real winners were users that took the opportunity to negotiate new contracts, Levine said. Whether they switched carriers or merely used the threat of a switch to cut a better deal, tough negotiators were able to win savings of 10% to 20%.

Levine's estimates of small changes during Fresh Look fits with reports from Sprint Corp. Customer gains at Sprint have been small, with only two to four AT&T customers leaving the carrier outright for Sprint, a company spokesman said.

CORRECTION

The story "Microtest tool to link CDROMs to NetWare LANs" on page 18 last week carried an incorrect phone number for Microtest, Inc. The correct phone number is (602) 952-6400.

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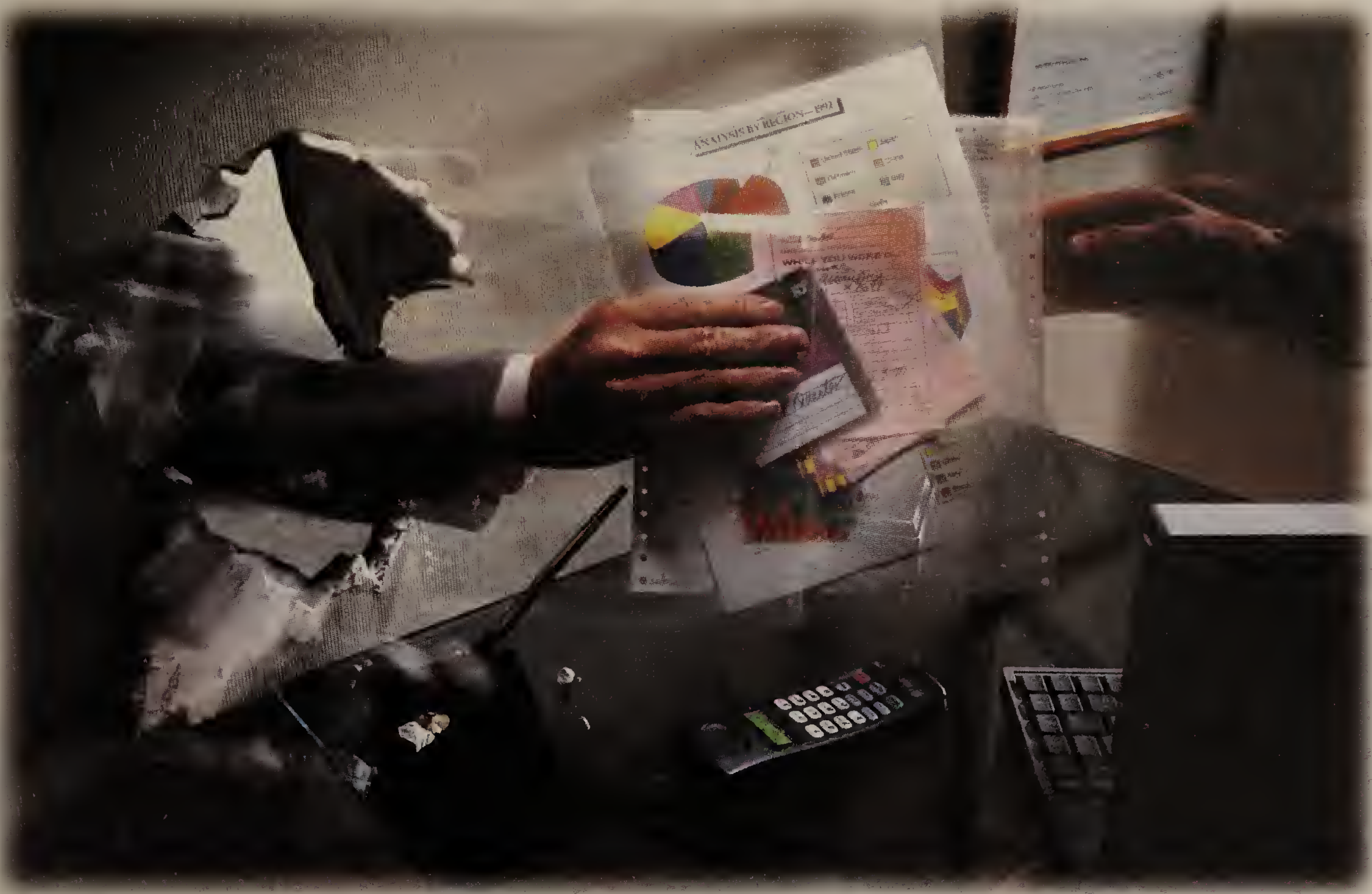

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Ungermann steps down as UB shifts market focus

BY SKIP MACASKILL

Santa Clara, Calif.

Putting an end to months of rumors, Ungermann-Bass, Inc. founder Ralph Ungermann last week resigned as president and chief executive officer of the company, saying he will form a new company within the next few months.

UNGERMANN

In conjunction with the move, UB laid off 20% of its work force and announced plans to roll out a line of departmental local-area network hubs to complement its family of high-end hubs.

As part of the realignment, UB will spin off into an independent, jointly owned company the development work it is doing with Bolt Beranek and Newman, Inc. (BBN) on Asynchronous Transfer Mode (ATM) technology.

According to Wayne Benoit, executive vice president of product operations, the realignment is intended to help the company regain network market share and was not related to the massive restructuring that Tandem Computers, Inc., UB's parent company, announced on the same day last week.

"Our restructuring was done by UB and within UB because of the business climate and had no cause-and-effect relationship to Tandem's activity," he said. "I realize that may be tough to swallow, but it's really the case. If we had had a different quarter and if the high end of this market was taking off the way the mid-range is, then we would not have done this."

Jim Treybig, president and CEO of Tandem, said the UB restructuring is not simply an attempt to spruce up the hub company before selling it, as some analysts have speculated. "UB is not for sale and has never been for sale," he said. "That is not a lie, and I'm prepared to put that in writing."

While Tandem would only confirm that UB has lost money in the previous two quarters, sources said the company lost in excess of $7 million in the last quarter alone.

Steve Diamond, who was named UB's vice president of marketing last week, attributed the loss to a continued focus on the high end of the market, which is slowing down as the middle tier is taking off.

"Our market focus was most vulnerable to the economic climate and worldwide recessionary pressures, so we decided to revamp the company to better address the mid-tier hub market," he said. "We're also going to put a new distribution strategy in place that is aimed at that segment."

Although details of the new distribution and product strategies will not be made public until next week, Diamond indicated that the effort will involve increasing the number of salespeople and backing them up with inside sales and telemarketing. UB will also explore indirect sales channels in certain regional areas, moving somewhat away from its existing direct sales approach.

Analysts across the industry are supportive of UB's intention to refocus in that the company did not have much choice when faced with declining market figures and revenue.

"Judged by the slow growth it has had over the last three or four years, UB needed a fresh start," said Michael Howard, president of Infonetics Research, Inc., a consultancy in San Jose, Calif.

"Trying to reengineer your product strategy and focus on a new market while opening up distribution channels you've never explored before would be a tall order for anyone," said Fred McClimans, program director for Gartner Group, Inc., a market research firm in Stamford, Conn.

Part of the restructuring calls for the formation of LightStream Corp., which will consolidate the ATM efforts of both UB and BBN. Under terms of the agreement, BBN will move development of its Emerald ATM switch to LightStream, along with the complementary products UB has been working on.

BBN, which contributed $15 million to the project, will own 80% of the company, with the remainder going to UB, which put up $5 million. Initial products from this venture will be announced later this quarter.

Ungermann said he initiated UB's new corporate direction before tendering his resignation. "When UB was acquired in 1988 by Tandem, I made a five-year commitment to UB, which expires this year," he said. "I knew the day would arrive when I'd want to move on, so now I'm looking forward to making a fresh start."

Ungermann said he plans to start a new network venture within the next 60 days.

"We don't want UB to lose its focus on the campus and backbone technologies it's provided over the years, but we are glad to see the focus broaden to other areas of the market. The announcement has not shaken TI's confidence in UB as a key supplier in any way."

Blair Sanders
Senior member of the technical staff
Texas Instruments, Inc.
Plano, Texas.

"Ralph [Ungermann] has left, and that is a little disappointing in that he was the visionary of the company. UB is trying to get better focused on the market, and despite the layoffs that resulted, it will be a very positive move over time. I also think the move to spin off the [Asynchronous Transfer Mode] development with [Bolt Beranek and Newman, Inc.] into its own company was a shrewd business move in that it lets that team focus on a specific task."

Virgil Palmer
Manager of engineering and research
Telecommunications services division
Air Products and Chemicals, Inc.
Allentown, Pa.

Groupware, work flow industries form consortia

BY BOB BROWN AND PETER LISKER

San Jose, Calif.

Players in the groupware and work flow communities next week will announce the formation of industry coalitions dedicated to promoting the usage and interoperability of these new network-based applications.

The Groupware Users and Vendors Association (GUAVA) and the Workflow Management Coalition will be launched at the Groupware '93 and Workflow Conference on Business Process Technology, respectively, here.

GUAVA's mission is to bring together vendors and users of groupware to advocate interoperability in today's diverse network environments. The organization will also help educate potential users about groupware. It will hold its first meeting Aug. 10 to discuss a charter and elect officers. Group members have not been announced.

"The two major barriers to growth in the groupware industry are the business public's lack of knowledge about collaborative technologies and the cultural issues tied to them," said David Coleman, GUAVA's founder. "Another significant barrier is the lack of standards to support the heterogeneous com-

See **Groupware**, *page 48*

Bytex bolsters hub with SNA routing features

BY SKIP MACASKILL

Westborough, Mass.

Trying to shake off the effects of a losing second quarter, Bytex Corp. last week sought to regain some momentum with enhancements to its intelligent hub line that provide SNA routing and Ethernet switching capabilities.

The company announced six integrated routing modules for its Series 7700 switching hub that are based on CrossComm Corp.'s XL-80 high-end router and designed specifically for internetworking in IBM Systems Network Architecture environments.

In conjunction with the routing rollout, Bytex introduced two 10Base-T Ethernet switching modules for the 7700 that complement the hub's token-ring configuration switching features.

Each of the XL Router (XLR) modules comes with four Intel Corp. i960 Reduced Instruction Set Computing-based processors and supports Ethernet, token ring and a variety of wide-area services, with a forwarding rate of 30K packet/sec.

The modules employ CrossComm's Protocol Independent Routing (PIR) architecture, which uses a proprietary routing algorithm to support SNA traffic. They route around failed links in an average of three seconds, thereby maintaining the integrity of time-sensitive SNA sessions.

The four-port modules, which are hot-swappable and take up two slots in the 7700, can automatically adjust routing tables after detecting moves, adds and changes.

Net protocols supported include Novell, Inc. Internetwork Packet Exchange/Sequenced Packet

See **Bytex**, *page 48*

Proteon continues on downward spiral; CEO Courtin departs

BY MAUREEN MOLLOY

Westborough, Mass.

Proteon, Inc.'s financial tailspin picked up more speed last week when it posted a quarterly loss of more than $1.2 million and announced the resignation of President and Chief Executive Officer Patrick Courtin.

The latest results mark the third consecutive quarterly loss for the company. Net sales for the second quarter were also down — $26.9 million compared to $31.5 million for the same quarter last year.

Elliot Honan, Proteon's vice president and chief financial officer, who will serve as acting president until Courtin's replacement is announced, said Courtin's departure is an amicable one. The CEO had set up a new corporate structure during the past six months that better positions Proteon to regain prosperity and, having achieved that, chose to move on, he added.

Courtin was unavailable for comment.

COURTIN

According to many analysts, Proteon is still smarting from ill-conceived and badly executed sales and marketing programs that left it poorly equipped to compete in the fiercely competitive token-ring adapter and internet markets. Also, the expected gains from a restructuring implemented this spring has yet to translate into hard dollars and profits.

Most of the revenue falloff during the latest quarter was attributed to declining sales of the vendor's token-ring adapters and low-end hub products resulting from stiff price competition.

In an interview with *Network World* last month, Courtin outlined a number of new programs his company has created to restore its fiscal viability (*NW*, July 19, page 9). Chief among them was a reorganization earlier this year that divided the company into two operating units.

Proteon also stepped up its marketing efforts via seminars, telemarketing, advertising and other promotional channels.

Despite Proteon's financial performance this past year, Honan is confident Proteon will soon see the fruits of the reorganization and marketing efforts. "The restructuring is a major kingpin in the new focus," he said. "We see encouraging signs of progress, but that doesn't translate into sales overnight."

Others are not as optimistic, however. Andrew Schopick, an investment analyst at Nutmeg Securities, Ltd. in Westport, Conn., said significant challenges lie ahead for Proteon before it can overcome the loss of market momentum.

"The company is going to remain in a loss position potentially through the balance of '93 before the effects of the restructuring and change in marketing strategy — and possibly, leadership — can exert a more positive influence," he said.

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Carriers report strong 2Q profits, then raise rates

BY BILL BURCH

Washington, D.C.

Although MCI Communications Corp. and Sprint Corp. both posted solid profits in the second quarter, the companies have told the FCC they want to follow AT&T's example and raise business rates an average of 3.9% beginning Aug. 6.

MCI earned $150 million in the second quarter on revenue of $2.92 billion, compared with income of $149 million on revenue of $2.60 billion in the second quarter of 1992.

Despite that showing, MCI told the Federal Communications Commission it wants to raise rates an average 3.9% for about 20 services, including calling cards and 800 service. The carrier plans to hold off on raising private-line rates, although increases are planned there, too, a company spokesman said.

MCI said its price increase would help fund network upgrades, in particular, the move to Synchronous Optical Network. The carrier is installing fiber routes between Salt Lake City and Chicago, and between Sacramento, Calif., and Seattle.

Sprint's quarterly statement shows net income rose to $157 million on revenue of $2.8 billion, compared with a net income of $148 million on revenue of $2.57 billion last year.

Sprint also plans to raise its rates an average 3.9% on Aug. 6, given FCC approval. Sprint's individual services will increase in price from 3.8% to 4.1%. It plans to hold off on raising rates for its Clarity small business services until September. "We face the same competitive pressures as the rest of the long-distance industry and adjust our rates to reflect those variations," a Sprint spokesman said. "Over the past five years, Sprint's rates have fallen by roughly 20%."

AT&T started the rate hike race in July with a 3.9% average increase for its business services. That increase came three days before the carrier reported it earned $1.04 billion on revenue of $16.31 billion in the second quarter.

In the long-distance market, AT&T's traffic volume continued to grow and margins improved, but revenue was about even with a year ago, partly because customers chose lower-priced AT&T services, its quarterly earnings report said. Without such adjustments, revenues would have grown 1.5%.

With AT&T, MCI and Sprint all reporting strong profits but still raising rates, some argue the long-distance market is less than competitive. "That is fairly strong evidence that this industry is moving towards an active oligopoly," said Washington telecommunications attorney Hank Levine. He suggests the rate increases may help the regional Bell holding companies in their request for permission to provide long-distance service.

"The [RBHCs'] claims are stronger than they've been in a decade," Levine said. ☒

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1993 Network Systems Corporation

Novell intros NetWare for SAA mgmt. app

BY CARYN GILLOOLY

Sunnyvale, Calif.

In another push to boost the capabilities of its NetWare Management System (NMS), Novell, Inc. last week announced a new application that will let administrators manage their LAN-to-host links through NMS.

HARGUINDEGUY

NetWare for SAA Services Manager 2.0 is an application that runs alongside other NMS applications and helps administrators manage NetWare for SAA servers throughout the enterprise net. NetWare for SAA provides host access for workstations on a NetWare local-area net.

The product gives an administrator at an NMS console a graphical view of all NetWare for SAA servers. More importantly, the administrator can click on an icon of any NetWare for SAA server on the network map and receive a wealth of management information.

For example, the administrator can view the configuration of that server as well as host-connection usage information, including user names, physical locations of users, host applications being accessed and the duration of host sessions.

NetWare for SAA Services Manager also

See **Novell**, *page 48*

ENTERPRISE INTERNETS

Data Network Architectures, Standards, Equipment and Management

SNA NETWORKING

Apertus adds low-end SNA, TCP/IP integration device

BY MICHAEL COONEY

Eden Prairie, Minn.

Apertus Technologies last week rolled out a competitor to IBM's LAN-attached 3174 controller that is intended to help users integrate SNA and TCP/IP traffic over a single backbone.

The Apertus Model 6630 3270 Access Hub is a low-end, modular communications controller that can attach as many as 32 3270 devices to a local-area network and provide them with access to Systems Network Architecture or Transmission Control Protocol/Internet Protocol host resources.

The Model 6630 comprises an Apertus Datastar chassis, hot-swappable 3270 modules and up to two modules for attaching to Ethernet and 4M or 16M bit/sec token-ring LANs. Support for 3270 terminals can be added in increments of four, 16 or 32. Telnet and TN3270-emulation support is included for accessing TCP/IP resources.

"Users can eliminate their old SDLC environment and bring their 3270 devices right onto the LAN," said Martin Hahn, vice president of marketing for Apertus. "The 6630 also elimi-

See **Apertus**, *page 14*

3270 controller shipments by vendor

Vendor	Shipments		Installed base
	1991	1992	
IBM	22,500	13,520	195,860
Memorex Telex Corp.	11,500	10,145	55,580
IDEA	2,100	1,564	10,380
Harris Adacom Corp.	1,500	1,160	9,076
Lee Data Corp.	550	488	4,154
McDATA Corp.	1,640	1,655	3,448
Apertus Technologies, Inc.	490	485	1,125

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

BRIEFS

Tekelec, Inc. announced last week that it has boosted the capacity of its Chameleon Open LAN/WAN protocol analyzer to support seven test slots — three more than the existing model. The Chameleon Open monitors traffic across Switched Multimegabit Data Service's Subscriber Network Interface layer at speeds up to 45M bit/sec and can decode most local- and wide-area network protocols.

Tekelec: (818) 880-5656.

Compatible Systems Corp. announced last week new wiring connection interfaces on its family of LocalTalk-to-Ethernet routers that enable users to automatically switch between thick coaxial, thin coaxial and 10Base-T twisted-pair wiring schemes, thereby providing easier cable hookups for net administrators during equipment moves or net upgrades.

Compatible Systems: (303) 444-9532.

TxPort has announced a fractional T-1 data service unit/channel service unit with an embedded Simple Network Management Protocol agent, which enables the device to be managed from any SNMP console.

The Prism 3000 costs $2,895 and is available now.

TxPort: (205) 837-2755.

Promptus Communications, Inc. last week said its Oasis line of inverse multiplexers has been certified for compatibility with Nynex Corp.'s Multirate ISDN Service.

Oasis will allow Multirate ISDN customers to dial up bandwidth in increments of 64K bit/sec for applications such as videoconferencing, local-area network interconnect, imaging and disaster recovery, Promptus said.

Multirate ISDN support is available now on Promptus' Oasis 200T and Oasis 1000 muxes. An Oasis 200T with Multirate ISDN, two data ports and two RS-366 dialing ports costs $6,500.

Promptus: (401) 683-6100.

HP OpenView probes LANs

Unix, Windows versions support token ring, Ethernet.

BY JIM DUFFY

Colorado Springs

Hewlett-Packard Co. last week unveiled software for its OpenView management system that collects data from a new HP token-ring LAN analyzer, also introduced last week, and the vendor's existing Ethernet analyzer.

Combined, the products enable HP's Unix- and Windows-based OpenView network and systems management platforms to govern distributed local-area network internets comprising Ethernets and token rings. Previously, the Unix product could only manage Ethernet LANs, while the Windows version could not manage either.

The new LAN analyzer, LanProbe II/Token-Ring, is hardware that resides on each LAN segment that is to be monitored. It collects statistics and analyzes performance on distributed token-ring LANs.

Like LanProbe II/Ethernet, LanProbe II/Token-Ring identifies duplicate Internet Protocol addresses, measures real-time network utilization, traps significant network events and triggers alarms based on user-defined thresholds, such as network utilization, packet collisions and error conditions.

The new software, meanwhile, is called Probe Manager Version 2.0 for HP's Unix-based OpenView system, and ProbeView/SNMP for the company's OpenView for Windows platform.

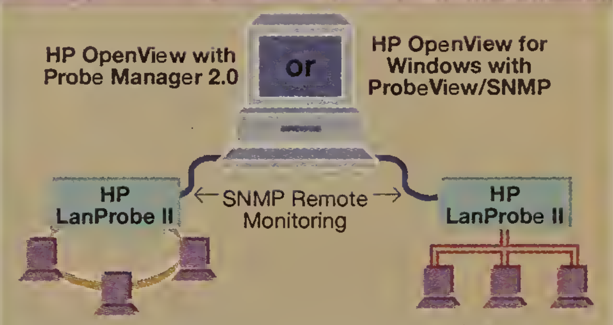
Probe Manager 2.0 runs on top of OpenView on HP's Unix-based Series 9000 systems. It allows OpenView users to access the information collected by the LanProbes, including traps and alarms, and display it on an OpenView screen.

Probe Manager 1.0 only collected data from HP's LanProbe II/Ethernet.

Using Probe Manager 2.0, network managers can also capture a packet if it contains an error, display a Simple Network Management Protocol message on the OpenView screen or kick off a script file that could, for example, launch a trouble ticket when an alarm is triggered. The software also allows managers to remotely set the configuration of the LanProbes, including updating the analyzer's firmware.

See **OpenView**, *page 14*

Probing for information


HP OpenView with Probe Manager 2.0
or
HP OpenView for Windows with ProbeView/SNMP
HP LanProbe II
SNMP Remote Monitoring
HP LanProbe II

HP's new Probe Manager 2.0 and ProbeView/SNMP software allows network managers to compile diagnostic information on distributed token-ring and Ethernet LANs at a central OpenView console.

SOURCE: HEWLETT-PACKARD CO., COLORADO SPRINGS
GRAPHIC BY SUSAN SLATER

ADC units team to address ATM strategy with five rollouts

BY MAUREEN MOLLOY

Minneapolis

ADC Telecommunications, Inc. has announced a multitiered strategy for adding Asynchronous Transfer Mode (ATM) support to its family of intelligent hubs, multiplexers and channel service units.

The company said it is leveraging the development expertise of its three business units — ADC Fibermux, ADC Kentrox and ADC Transmission Division — to provide five products that address users' desktop, local- and wide-area ATM requirements.

The first two are ATM network access products developed by ADC Kentrox that include the DataSmart T3/E3 ATM DSU (ADSU) and a low-speed ATM access concentrator, the AAC-1.

The ADSU is a stand-alone device equipped with a single ATM interface aimed at supporting bandwidth-intensive applications such as medical imaging. It also supports Switched Multimegabit Data Service (SMDS)-compatible equipment at the user site and is programmable to support the SMDS Subscriber Network Interface.

The AAC-1 uses multiplexing to concentrate multiple types of traffic at the user site — including frame relay and isochronous traffic — onto a single T-1 link to an ATM or SMDS network.

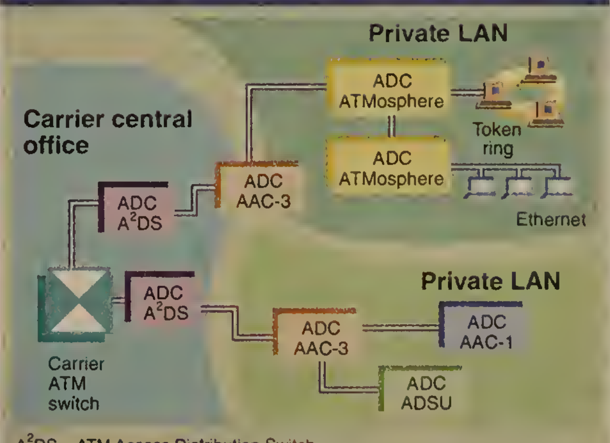
The ADSU and AAC-1 will be available by the end of the year. Pricing for both will be announced at INTEROP 93 later this month.

Next, the vendor will provide a local ATM backbone hub that will consolidate voice, video and LAN traffic in a single device. Developed by ADC's Fibermux division, the ATMosphere hub will be an upgraded version of Fibermux's existing Crossbow hub. It will support Ethernet and token-ring LANs and use ATM switching to provide so-called virtual networking.

Virtual networking lets users configure dedicated LAN links to the desktop

See ADC, *page 14*

ADC preps ATM rollout



A^{2}DS = ATM Access Distribution Switch

ADC's 5 new products will address users' desktop, local- and wide-area Asynchronous Transfer Mode requirements.

SOURCE: ADC TELECOMMUNICATIONS, INC., MINNEAPOLIS
GRAPHIC BY TERRI MITCHELL

INTERNETWORKING MONITOR

by Scott Bradner

The end of the world? Not quite yet

On and off during the past year or so, there have been all sorts of "death by reason of success" stories popping up all over the place about TCP/IP.

The basic theme of these stories is that the Transmission Control Protocol/Internet Protocol has become too popular. The assignment of network numbers is proceeding at such a pace that the pool of one type of addresses, known as Class B addresses, will be exhausted very soon. Early predictions, which surfaced almost two years ago, had that exhaustion occurring by now.

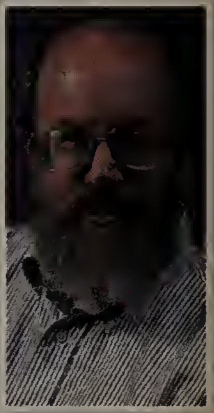
There are basically three types of network addresses used in TCP/IP. Class A addresses are capable of supporting 16 million hosts and are used for very large companies or even whole countries. Class B addresses are able to support 65,000 hosts and are used in midsize companies and educational institutions, while Class C addresses, which support 254 hosts, are used for small organizations or individual local-area networks.

According to the exhaustion theory, most organizations required the use of one or more Class B addresses. More than half of the potential Class B addresses had already been assigned, and the rate of assignment was increasing. Projected growth in demand showed that the supply would be exhausted in a year or two.

Somewhat forgotten by the press in this doomsday prediction was the fact that there were millions of Class C addresses available and organizations could use a whole bunch of Class Cs instead of a few Class Bs. However, there is a big problem with this approach.

The routers that hold together the national and international backbone segments of the Internet must maintain a listing of all reachable networks and a map, known as a routing table, showing how to get to each network. The routers exchange information and status messages to maintain the tables.

There are about 13,000 nets in the backbone routers' routing tables. Increasing the size of these tables by adding lots of Class C addresses produces an unacceptable load on the routers and increases the overhead traffic required between them.



BRADNER
Harvard University

A successor to TCP/IP would be required in the very near future. Actually, it would be a successor to IP since TCP is not directly affected by the addressing problem.

Several proposals were made to the Internet Engineering Task Force (IETF). The IETF has been debating the proposals as well as the procedures that should be followed in making such a far-reaching decision. One does have to be a bit careful when one's decision affects a few million computers worldwide.

However, the pressure may be eased for a while. There is a relatively new proposal known as Classless Inter-Domain Routing (CIDR), which allows the aggregation of routing information. A company could be assigned 5,000 Class C addresses but only appear as a single entry in a routing table. The Internet Architecture Board (IAB), in RFC 1481, endorsed the CIDR architecture and its implementation.

With the assumption that CIDR will be deployed, multiple Class C addresses are now being assigned in place of Class B addresses. Use of CIDR does not obviate the need to choose a new IP, but by postponing the deadline for the choice, it will allow a more measured decision process.

On a completely different topic: It has long been a tradition on the Internet mailing lists to end one's postings with a disclaimer to ensure that no one confuses the author's opinions with those of the author's employers. This is something I should have been doing in this column from the start since it is quite unlikely that any opinion I might put forth would be universally supported across the large and varied Harvard University.

I'm going to start a disclaimer-of-the-month featurette using disclaimers gleaned from the Internet. One I will not be using is from Martin Cockerell of Whiteleaf Bucks in the U.K.: "Any views expressed are fully supported by the company. (*I own it*)"

➥ Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

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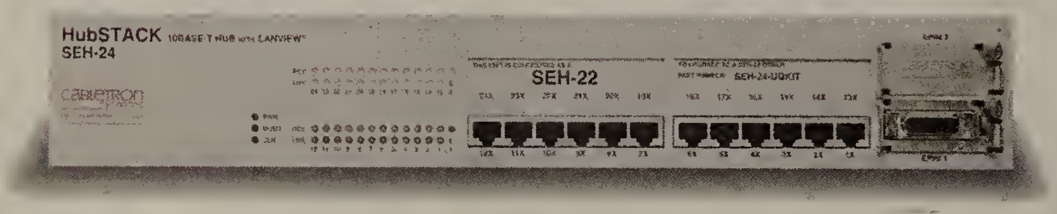

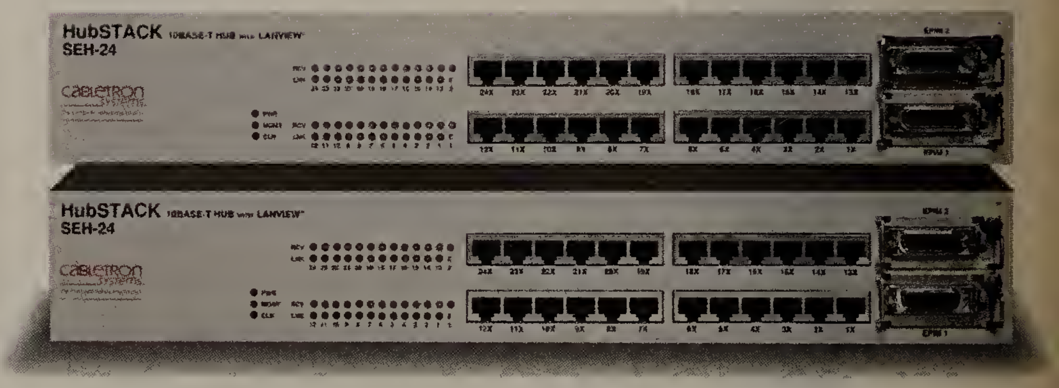

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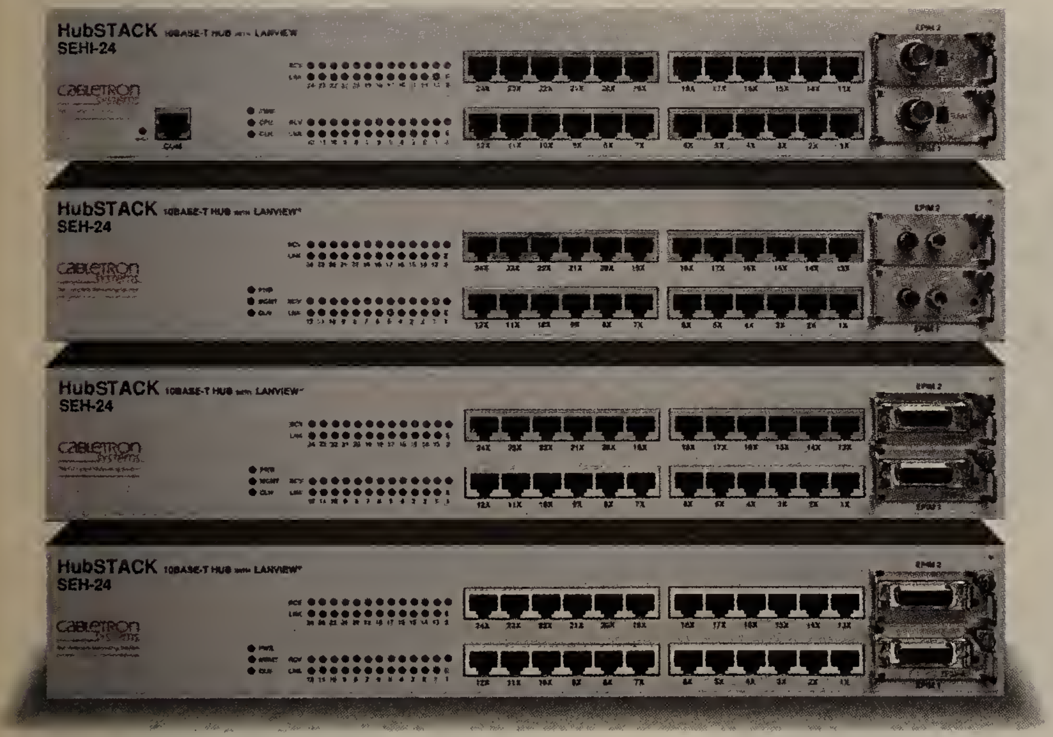

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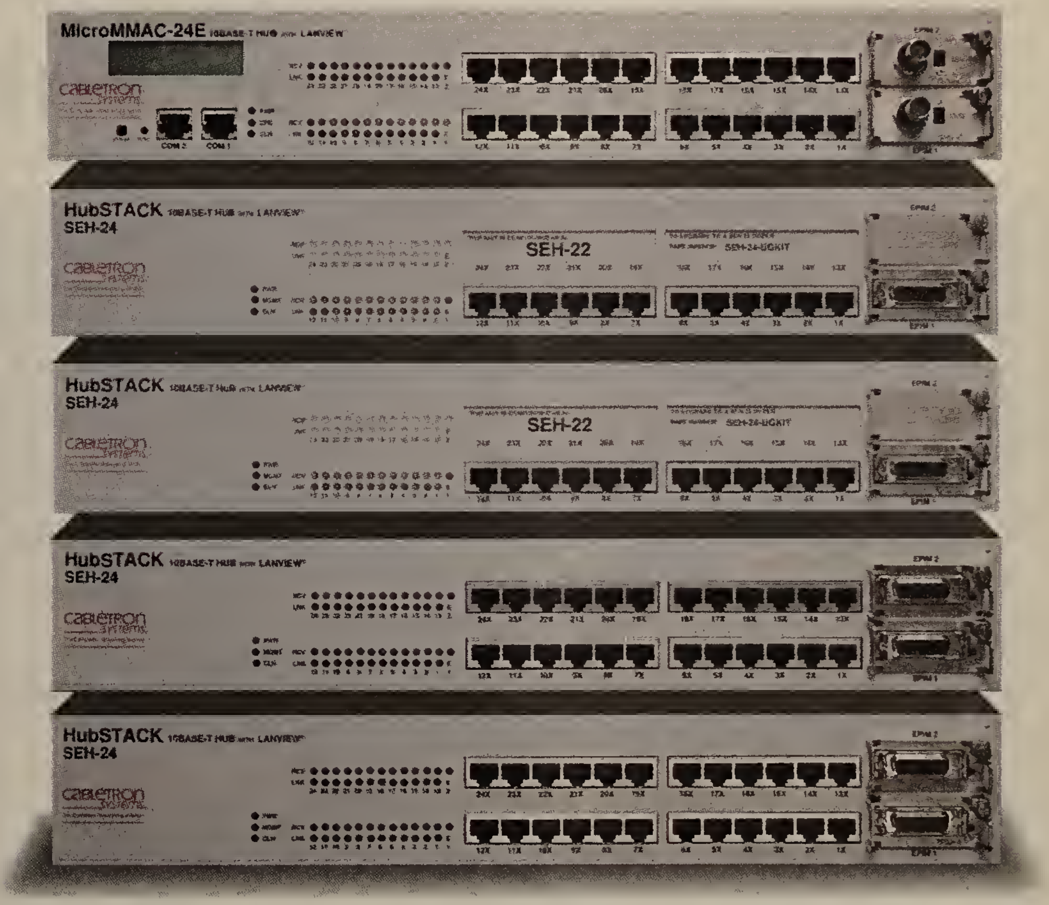

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OpenView

Continued from page 9

In addition to SNMP, Probe Manager 2.0 and the LanProbes support the Remote Monitoring (RMON) Management Information Base (MIB). RMON is said to provide more comprehensive fault diagnosis, network planning and performance-tuning capabilities than existing SNMP MIBs and remote monitoring agents.

The LanProbes also support an out-of-band connection to the OpenView console so management data can still be collected if the LAN segment goes down.

ProbeView/SNMP, meanwhile, performs the same functions as Probe Manager 2.0 but runs as an HP OpenView for Windows application on Intel Corp.-based personal computers.

Both software packages have only been certified to work with HP LAN monitors, said Bill Tomeo, general manager of HP's Network Test Division here. He said he was unaware of any plans to support other vendors' LAN analyzers with the software.

Probe Manager 2.0 and ProbeView/SNMP feature security parameters that establish monitor-only access and are designed to keep unauthorized personnel from changing probe measurement setup and IP addresses, as well as viewing captured packets.

According to analysts, the new products fill a gap in OpenView's LAN management capabilities. "This allows you to get right down to the physical nuts and bolts," said John McConnell, vice president of Infonetics Research, Inc. in Boulder, Colo. "It's surprising that HP hasn't moved faster on this."

The LanProbe II/Token-Ring network monitor costs $2,995 and will be available in September. Probe Manager 2.0 costs $6,500 and will be available in October. ProbeView/SNMP costs $3,500, which includes a license for OpenView for Windows, and will be available in September.

ⒸHP: (415) 857-1501.

Apertus

Continued from page 9

nates the need to maintain parallel SNA/SDLC connections" when used with a bridge or router to supply a wide-area link.

Apertus positions the 6630 as a more functional, inexpensive replacement for traditional IBM 31X4 communications controllers. Users can also migrate to Apertus' larger 6640 3270 Access Hub, which supports 128 3270 devices, should their environments grow, Hahn said.

"The 6630 lets users mix and match protocols and network connections in a single, hot-swappable system," Hahn said. Users can scale it up and have more network configuration options with the 6630."

IBM added full TCP/IP and Ethernet support to its 3174 controllers in May, Hahn noted, but the capabilities will not be available until December. In addition, a fully configured 3174 with TCP/IP support will cost $13,410 to $17,830 plus an additional $4,000 for the Ethernet adapter, while the 6630 is available now for $8,784 to $10,739, depending on configuration.

ⒸApertus: (800) 888-1967.

ADC

Continued from page 9

and supports adds, moves and changes via software, obviating the need to change cables manually. The ATMosphere ATM hub will be available early next year. Pricing has not yet been set.

ATM ON THE WAN

The ADSU, AAC-1 and ATMosphere can all act as feeder devices into the vendor's fourth ATM product, the 1.2G bit/sec AAC-3 ATM access concentrator. The AAC-3 will support as many as 16 modules, each of which support up to four ports and act as the access point on the customer premises site to the wide-area ATM network. The ports will support any device at the user site and convert data from those devices into 53-byte ATM cells for transport to a carrier's central office switch.

Jointly developed by ADC Kentrox and ADC's Transmission Division, the AAC-3 will be available by the middle of next year. It can be used as a stand-alone device or as part of ADC's so-called Broadband Soneplex Platform, which also comprises an ATM switch called the ATM Access Distribution Switch (A^2DS).

The A^2DS is an ATM backbone switch that is designed to serve the periphery of public nets or very large private networks. The switch, which will be jointly developed by ADC's Transmission Divison and Loral Data Systems, can be used to build private wide-area ATM networks or feed into larger ATM switches and carrier networks.

The switch will support as many as 16 AAC-3 units and be equipped with a 5G bit/sec ATM bus.

The A^2DS will be available by mid-1994. Pricing has not yet been set.

ⒸADC: (612) 946-3104.

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BRIEFS

Banyan Systems, Inc. reported second-quarter revenue of $32.2 million, up from $27.5 million in the same quarter last year. Net income was $3.49 million, an 89% increase over last year's second-quarter results. Revenue for the first six months increased to $62.6 million from $54.6 million in the same period last year. Net income in the half was $6.27 million, compared to $3.46 million in 1992.

LAN Performance Labs (LPL) has announced a worldwide licensing agreement with **Novell, Inc.** under which LPL will ship its T100 100M bit/sec Fast Ethernet adapters with Novell's NetWare Workstation for DOS/Windows software.

The T100 adapters, which include the T100A 16-bit Industry Standard Architecture (ISA) version and the T100E 32-bit Extended ISA model, will include Open Data-link Interface drivers for Novell's NetWare 4.0 and 3.11.

LPL: (619) 273-1442.

Leprechaun Software International, Ltd. last week rolled out the Network Security Organizer (NSO), software for Novell, Inc. NetWare 3.11 servers that distributes updates of various antivirus software to end nodes throughout the network.

The software can also identify potential "virus holes" by searching for end nodes without virus protection as well as alerting net managers to where a virus would spread based on what access that unprotected end node has to other network resources. NSO also logs details of any program run from a floppy drive, providing the net manager with documentation in the event a virus situation arises from the program.

A workstation inventory is also included that notifies the net manager of any hardware changes, such as if a disk gets swapped out, and software information, such as the type of program and its version number of a particular application running on the machine.

Available now, NSO costs $250 for a five-user site license.

Leprechaun: (404) 917-8900.

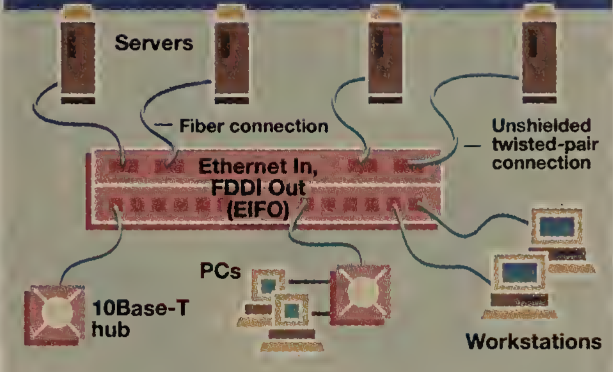
SynOptics Communications, Inc. reported record revenue of $180 million for the second quarter ended July 2, an increase of 120% over the same quarter last year. Net income was $24.5 million, a 248% increase over the same period in 1992.

Chipcom Corp. posted record revenue of $35.79 million for its second quarter ended June 26, a 93% increase over the same period last year. Net income rose 62% from second-quarter 1992 to $3.2 million.

The company also announced that it filed a registration statement with the Securities and Exchange Commission to publicly offer 800,000 shares of its common stock in order to secure working capital for general corporate purposes, including product development and possible acquisitions.

See Briefs, *page 20*

Revving up the server pipe


Servers
Fiber connection
Unshielded twisted-pair connection
Ethernet In, FDDI Out (EIFO)
PCs
10Base-T hub
Workstations

Using an EIFO switching hub with FDDI links to a server cluster, Ethernet LAN segments and high-performance workstation users get 10M bit/sec dedicated pipes of bandwidth and more efficient access to the servers.

SOURCE: NETWORK PERIPHERALS, INC., MILPITAS, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

NPI uses FDDI to bolster Ethernet switching hub

BY SKIP MACASKILL

Milpitas, Calif.

Network Peripherals, Inc. (NPI) this week will roll out an Ethernet switching hub that provides dedicated 10M bit/sec links between end nodes and has a Fiber Distributed Data Interface backplane to support servers.

The Ethernet In, FDDI Out (EIFO) Client/Server Switching Hub "provides Ethernet users with an easy way to get to a higher performance network without making any adjustments at the end stations," said Gordon Stitt, vice president of marketing at NPI.

Instead of creating bottlenecks by hanging servers off of 10M bit/sec ports, the hub connects 10M bit/sec workstation links to a 100M bit/sec FDDI bus used to support servers, Stitt added.

The hub is a 14-port device that handles 12 ports of dedicated 10Base-T Ethernet via RJ-45 connectors and two FDDI ports for unshielded twisted-pair or fiber-optic links. Two additional FDDI connections

See NPI, *page20*

LAN NETWORK MANAGEMENT

IBM tests waters for LAN NetView mgmt. platform

BY CHRISTINE BURNS

Austin, Texas

IBM last week said third-party application developers are flocking to LAN NetView, its fledgling local-area network management platform, and said it is extending beta testing to give users a closer look at the product.

LAN NetView, introduced last fall as LANfocus Management/2 (*NW*, Oct. 12, 1992, page 6), was renamed in December to allign it with IBM's established NetView and NetView/6000 management products, said Art Olbert, president of IBM's Personal Software Systems division.

"We've been enticing developers to try this beta version since February, and now we're giving users a chance to try out LAN NetView working with third-party applications so that they can see what it can really do," Olbert said.

The company has not yet determined a shipping date for LAN NetView but indicated that decision will be made in early fall.

LAN NetView comprises a suite of software products that let LAN users distribute software as well as monitor and control network devices, operating systems and applications while sharing net information with other IBM and non-IBM management systems.

It is compliant with the Open Software Foundation, Inc.'s standards-based Distributed Management Environment architecture and supports OS/2, DOS, Windows and Macintosh clients. LAN NetView will support both the Common Management Information Protocol and the Simple Network Management Protocol.

Olbert said LAN NetView has three layers. At the base is the infrastructure that provides the means to manage the LAN. Management applications written to LAN NetView fall in the middle layer, and riding on top is a system administration interface.

About a dozen third-party vendors are expected to deliver LAN NetView applications by the end of the year. Olbert said about 30 more vendors have enrolled in the LAN NetView Independent Software Program.

Novell, Inc. has already made available its NetWare Services Manager for LAN NetView, which will allow a system administrator to manage NetWare file servers from a LAN NetView console.

Computer Associates International, Inc. of San Jose, Calif., will also offer server management capabilities through an extended version of its CA Unicenter LAN server management program for LAN NetView.

In addition, Microcom, Inc. is planning to port its LANlord desktop management software to LAN NetView. LANlord agent software residing on the client tracks workstation and server configuration and other items such as memory, disk space and CPU utiliza-

See LAN NetView, *page 19*

Worldwide forestry co. moves to Unix-based client/server

BY CHRISTINE BURNS

Seattle

Weyerhaeuser Co. has taken the downsizing plunge.

The company, one of the world's largest manufacturers of forestry products, will be migrating critical business applications from host systems to a Unix-based client/server network over the next five to seven years.

Weyerhaeuser recently signed a $25-million contract with Hewlett-Packard Co. for HP's Precision Architecture-Reduced Instruction Set Computing 9000 servers and workstations, which will take over processing chores from a collage of IBM mainframes, HP3000s, Digital Equipment Corp. VAXes and Data General Corp. equipment.

"Our problem is that we've got one of every kind of computer from every company there is," said Carl Presley, Weyerhaeuser's open systems partnership manager. "Our technical staff spends too much energy getting our diverse machines to communicate instead of focusing on business problems. We're migrating to an open system so we can spend more time on business problems and less time wrestling with the technology."

The HP Apollo 9000 Series 800 business servers, the Apollo 9000 Series 700 workstations and the HP 700/RX workstations will be installed in Weyerhaeuser's 11 primary manufacturing facilities and 35 cardboard box production plants throughout the northwestern U.S. and Canada, as well as in sales offices in Geneva and Tokyo.

Weyerhaeuser will continue to use some hosts during the transition but plans to dispose of them when the transition is complete. "We see making this commitment to Unix standards as something that we are actively doing to push the technology providers in that direction," Presley said.

The firm is now transitioning its current Weyerhaeuser Data Network, an X.25 and IBM Systems Network Architecture net, to a Transmission Control Protocol/Internet Protocol-based backbone internetwork.

Weyerhaeuser employees will be able to access the business and financial applications through the Unix-based workstations, which will be linked to a local Apollo 9000 Series 800 server. The servers will be connected across the TCP/IP backbone. Weyerhaeuser will use HP's OpenView for network management and look to both HP

See Unix, *page 19*

Announcing the first network printer

Operating System	*Topology*
Novell Netware	**Ethernet/802.3* *Token Ring (4/16 Mbps)*
Microsoft® LAN Manager	**802.3* *Token Ring (4/16Mbps)*
Windows for Workgroups	**802.3* *Token Ring (4/16 Mbps)*
Windows NT	**802.3* *Token Ring (4/16 Mbps)*
IBM LAN Server	**802.3* *Token Ring (4/16 Mbps)*
AppleTalk	**LocalTalk* **EtherTalk*
*HP-UX***	**Ethernet*
*SunOS***	**Ethernet*
*Solaris***	**Ethernet*
SCO UNIX®	**Ethernet*

Multiple environments are no longer worlds apart. Even if you have Novell Netware on one network, HP-UX on another and EtherTalk on a third, the new HP LaserJet 4Si MX printer easily connects across platforms. Automatically.

The HP LaserJet 4Si MX printer comes out-of-the-box preconfigured for multiple environments. There's nothing more to do than plug-and-play. All interfaces are simultaneously hot, making switching so seamless, end-users won't even notice.

What's more, HP's LaserJet 4Si MX printer is ready to handle whatever needs come down the

*Standard in the HP LaserJet 4SI MX printer. **For operating HP-UX, SunOS or Solaris, a one-time purchase of $199 in configuration software is required. Adobe and PostScript are trademarks of Adobe Systems Inc. which may be registered in certain jurisdictions. Microsoft is a U.S. registered trademark of Microsoft Corporation. UNIX is a registered trademark of UNIX System Laboratories Inc. in the U.S.A. and other countries. †In Canada call 1-800-387-3867, Ext. 7299.
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that adapts to multiple environments.

pike. More operating systems? No problem. As your network system continues to evolve, the capabilities of this printer are no longer just impressive. They're indispensable.

The HP LaserJet 4Si MX printer is loaded with features that define state-of-the-art. HP's enhanced PCL5 and genuine PostScript™ Level 2 software from Adobe™ come standard. Printer environments are saved while switching. Setup is a cinch with network software utilities and drivers included in the box. And, if you need any reassurance about trouble-free operation, you have it in our Simple Network Management Protocol (SNMP) support.

At 17 ppm, this is the fastest LaserJet ever, with I/Os and RISC-based formatter capabilities matched to support its speed. It delivers impeccable 600 dpi print quality—thanks to HP's microfine toner and Resolution Enhancement technology. Plus, it comes standard with two 500 sheet input trays.

But what if you don't need the full capabilities of the HP LaserJet 4Si MX printer right away? HP offers another printer that's probably a perfect fit. The HP LaserJet 4Si printer delivers the identical 17 ppm performance and superb 600 dpi print quality. It also has room to grow. The two MIO expansion slots let you add HP JetDirect network interface or third party cards. And you can add on Adobe's genuine PostScript Level 2 software and SIMM memory modules, as you need them.

To find out more about the multiple-network HP LaserJet 4Si MX printer and the upgradable HP LaserJet 4Si printer just call 1-800-LASERJET, Ext. 7299.† Capabilities this advanced make a world of difference—in any environment.

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Hierarchical storage mgmt. fast becoming LAN issue

Features provide mainframe-level storage capabilities.

BY CARYN GILLOOLY

Naperville, Ill.

Just as mainframe storage capabilities are moving to local-area network platforms, hierarchical storage management is fast becoming a LAN issue. For example, Palindrome Corp. last week introduced a new version of its Network Archivist backup and archival software that includes hierarchical features.

Hierarchical storage management is a typical mainframe storage capability whereby data is migrated out of primary storage to secondary storage facilities based on the date the data was last accessed.

The new Network Archivist 3.0 provides that capability for Novell, Inc. LAN environments. Through a NetWare Loadable Module residing on a NetWare 3.X or 4.X server, the system can automatically migrate data off a drive array, for example, and onto optical or tape media for long-term storage.

Network Archivist 3.0 provides more flexibility than the average mainframe system. First, the software will let the administrator classify data in different ways. This means large images can be automatically sent to an alternate storage device to save personal computer-based disk space, regardless of when the applications were last accessed.

The software will also let administrators dictate a migration path for data, letting the administrator specify that all imaging applications always be migrated specifically to optical storage facilities, for example.

Like typical mainframe systems, Version 3.0 will also let users specify a "high-water mark," for server storage. This means administrators can specify that when a server is 90% full, for instance, the system should begin migrating data to a secondary storage device. The data can then be migrated according to date, data type and type of storage device.

"This is a logical migration for backup and archival software to take — it's all storage management," said Gene Della Torre, director of marketing at Palindrome, based here. "By integrating all functions into one package, we can save users a lot of time and money while giving the flexibility they need to store their data."

In other hierarchical storage management news, Advanced Software Concepts (ASC) has released a product called NetArchive 1.1. Unlike Palindrome's Network Archivist, ASC's NetArchive can migrate files from individual network workstations to a mass storage device elsewhere on the network. Other products migrate files from the file server, which, according to ASC, can be the source of network bottlenecks.

hi'er-ar'chi-cal stor-age man'age-ment (HSM): a software or software/hardware subsystem that stores and manages network information on a variety of media based on the importance of the data.

For example, an HSM will keep frequently accessed data on a server's hard drive and automatically move data accessed less frequently to optical or tape storage facilities. The system will keep track of which data is resident within which storage facility and move data between facilities if necessary.

Also, NetArchive runs on a variety of Unix platforms, such as those fromSun Microsystems, Inc. and Hewlett-Packard Co., letting users on those systems migrate their data to the mass storage device, regardless of the type of file server resident on the network.

Network Archivist 3.0 is available now for $1,695. Pricing for NetArchive 1.1, also available now, is determined by the media capacity managed and starts at $6,000.

©Palindrome: (708) 505-3300; Advanced Software Concepts: (619) 737-9544.

Centrum server gets AppleTalk support

BY FREDRIC PAUL

San Jose, Calif.

Centrum Communications, Inc. this week will announce support for the AppleTalk Remote Access Protocol (ARAP) on an upgraded version of its CentrumRemote remote network server.

CentrumRemote is designed to give nomadic users full network node status when they dial into the corporate local-area network. It is intended for both mobile users and small remote offices that may have limited LANs.

David Helfrich, Centrum's new vice president of marketing, said AppleTalk support is important because a recent study showed that 57% of all corporate internets use three or more protocols, one of which is invariably AppleTalk. In addition, Helfrich said 17% of 1992 notebook sales were Apple PowerBooks, making them an increasingly important market segment.

The Centrum implementation of AppleTalk will initially support ARA Version 1 and will support the Point-to-Point Protocol as developers' kits become available from Apple Computer, Inc.

The Remote Instruction Set Computing-based CentrumRemote combines bridge and router technology to give full LAN access to remote users via dial-up or leased lines. CentrumRemote supports multiple protocols in a single rack-mountable box, and the upgrade adds ARAP to a list of protocols, including Novell, Inc.'s Internetwork Packet Exchange (IPX), Transmission Control Protocol/Internet Protocol, VINES, Digital Equipment Corp.'s DECnet, IBM's Network Basic I/O System Extended User Interface and Xerox Corp.'s Xerox Network Systems. The upgrade is designed to give Macintosh and PowerBook users equal access to corporate networks.

CentrumRemote offers full network node access, giving remote users the same network privileges enjoyed by directly connected users. Centrum's Nomadic Network Architecture makes that possible by filtering out nuisance net maintenance traffic and employing sophisticated compression algorithms.

In addition, CentrumRemote connections are fully manageable and traceable by central network management systems, including support for Systems Network Management Protocol 2 with Centrum extensions. CentrumRemote delivers bandwidth on demand with dynamic bandwidth allocation and inverse multiplexing.

As of September, the new AppleTalk capabilities will be delivered in a free software upgrade to existing CentrumRemote users and included in all new versions of the product.

CentrumRemote prices start at $3,495 for a four-port unit and top out at $6,295 for a 16-port configuration.

According to Helfrich, the company is also considering expanding CentrumRemote into much larger versions for enterprise applications. "The people we're talking to need dozens and dozens of ports, maybe even hundreds," he said.

©Centrum: (408) 894-1800.

Unix

Continued from page 15

and other vendors to downsize its front office and back office business applications.

Front office applications, which handle such functions as order entry, quotes and estimates, and manufacturing and inventory, will be the first to be ported to the open environment.

That transition is now taking place as part of the first phase of client/server migration, dubbed the Leapfrog project.

The Leapfrog name was coined because the client/server effort jumps past an intermittent consolidation the company had considered. Weyerhaeuser contemplated consolidating processing from several IBM 4300 mainframes to a large IBM MVS host. The process manufacturing applications currently running on the IBM 4300s will be transferred to HP 9000 servers as Leapfrog progresses.

"For our manufacturing locations, particularly within our paper company, we decided that it makes more sense to have those business units go directly from their 4300s to an open system platform," Presley said.

The second phase, which is tentatively set for 1997-98 but may occur sooner, involves moving Weyerhaeuser's back room applications, such as accounting and payroll, to the open system.

The company is currently trying to consolidate independent applications running in different departments into a common set of applications that would run across all company local-area networks.

Presley said Weyerhaeuser officials are concerned about security and data integrity issues that arise with the move from a secure host environment to a distributed system.

While HP's Unix operating system offers a range of security and data integrity solutions, Presley said Weyerhaeuser will be looking at third-party security products to work on top of HP UX.

Weyerhaeuser expects to save money in the long run, but Presley said the company has not yet quantified what the cost savings will be and does expect to see a rise in technical support costs throughout the transition.

LAN NetView

Continued from page 15

tion, and reports that data to a local management server.

John Peters, director of product development at the Waltham, Mass.-based BGS Systems, Inc., said IBM's delay in delivering some of the LAN NetView code made it more difficult for his company to develop its Visualizer for OS/2 product. Visualizer takes performance statistics gathered by LAN NetView and presents them graphically to the system administrator, he said.

BGS engineers were pleased to see that LAN NetView was capable of giving them things like CPU utilization, but "It took a couple of months to get the code, and we had to design around those missing pieces and then make the adjustments to our product when the code finally came," Peters said.

BGS Systems, Inc. engineers were pleased that LAN NetView was capable of giving them things like CPU.

Shany, Inc. of Mountain View, Calif., had less trouble porting its Alertview product — which monitors how, when and where applications are running on clients throughout the system — to the LAN NetView platform. Doug Kolb, director of engineering at Shany, said Alertview was a natural port to LAN NetView because previous releases contained both NetView and SNMP support.

Network Telesis, Inc. of Calabasas, Calif., will ship its first SNMP-supported product to run on top of LAN NetView during the first quarter of 1994. Network Telesis will port Net-F/X, its current Systems Network Architecture-based enterprise performance measurement system, to LAN NetView. Net-F/X generates its own traffic to the mainframe hosts and LAN servers, measures resulting response time and presents the data to a centralized control console.

IBM has also developed its own applications. LAN NetView Scan keeps track of net resources and connections and provides a graphical representation of them for the administrator. LAN NetView Monitor watches the performance of OS/2-based clients and servers on the net, while LAN NetView Tie provides LAN NetView with connectivity to a host NetView product.

These IBM products may receive some competition from third-party developers. Strategic Solutions International, Inc. (SSI), based in Manchester, Conn., is positioning its new product, Service Point 32, as an extension to IBM's LAN NetView Tie, which will provide the ability to control non-SNA nodes and devices from a host-based NetView management system. Nathaniel Mills, vice president of engineering at SSI, said the company will also release a product in the near future that will "have a very good awareness of the SNA network, which LAN NetView does not have."

©IBM: (800) 426-2468.

Macintosh networking gear continues to make strides

BY FREDRIC PAUL

San Jose, Calif.

Despite the well-publicized troubles at Apple Computer, Inc., third-party companies continue to churn out Macintosh network products.

Recent support for Macintosh networks comes from companies such as MaCNet, a division of CNet Technology, Inc., based here, Sonic Systems, Inc. in Sunnyvale, Calif., Digital Pathways, Inc. in Mountain View, Calif., and Wholly Mac Software in Las Vegas.

MaCNet introduced a pair of new AAUI transceivers designed to work with the AAUI on-board Ethernet option on the Centris 610 and 650; the Quadra 800, 900 and 950 Macintosh systems; and LaserWriter IIG and 630 printers.

The new transceivers offer a choice of media options, including an AAUI to 10Base2 connector with an autoterminating BNC connector and an AAUI to 10Base-T connector that uses an RJ-45 connector. The compact transceivers cost $89 each.

MaCNet also rolled out the SCSI-490 and SCSI-490PB net adapters for Macintosh and PowerBook computers, respectively. Based on the National Semiconductor Corp. DP83902, the SCSI-490 is a stand-alone device that hooks up to the Small Computer System Interface (SCSI) port of almost any desktop Macintosh for connection to Ethernet local-area networks. The device also includes 64K bytes of buffered, static random-access memory for driver software and network services data.

Fully compatible with EtherTalk at the register level, the SCSI-490 also supports AppleTalk Phase I and Phase II, as well as AppleShare and Novell, Inc.'s NetWare for Macintosh. The product has a list price of $279.

The multimedia SCSI-490PB connects a PowerBook or Macintosh SCSI port to an Ethernet, regardless of the network media. Its small, external HDI-30 connector establishes the link to the PowerBook. The SCSI-490PB lists for $299. All of the MaCNet products are available now.

Sonic Systems' new Print Juggler software eases printing to networked printers by eliminating the multistep process of printer selection and monitoring. The Print Juggler icon becomes a permanent menu bar item, letting users quickly and easily monitor and select any network printer.

Users can also create icons for each networked printer. Print Juggler automatically updates these icons to reflect the printer's status. To print, users simply drag and drop a document icon on the printer icon. Print Juggler is available now and is priced at $49.

Digital Pathways has adapted its Defender 5000 security technology to work in dial-up AppleTalk Remote Access (ARA) environments. The Defender 5000 intercepts ARA client access attempts and creates an authentication dialogue. Once the user is verified, the person is returned to the ARA to complete the logon process.

Finally, a new version of Wholly Mac Software's MacLogin Script enhances the Macintosh NetWare logon process by giving network administrators the ability to display images, play sounds, launch applications, synchronize clocks or automatically log the user off after a specified period of time. The new capabilities will be available this month.

MacLogin Script costs $189 for a 25-user package, $329 for a 50-user package and $569 for a 100-user license. Additional 100-user packs cost $459. ◘

NPI

Continued from page 15

can be added, allowing EIFO to support as many as four FDDI clients or network servers.

Each Ethernet port can connect to a single high-performance workstation or an entire 10Base-T network, with each EIFO supporting as many as 1,024 Ethernet addresses.

EIFO is based on a series of custom application-specific integrated circuit (ASIC) chips developed by NPI that perform all the switching functions entirely in hardware, meaning there is no memory bottleneck to slow down packets as they move through the hub.

Each Ethernet port has its own ASIC chip, and there is a centralized chip that performs the FDDI-to-Ethernet packet conversion. Traffic on each Ethernet segment is localized, while packets addressed to servers or other segments are switched on and off the FDDI backplane at the media access control layer, meaning all protocols, including nonroutable ones, are supported.

Architecturally, EIFO resembles a Synernetics, Inc. LANplex 5000 intelligent switching hub in that traffic from the Ethernet ports is switched across an FDDI backplane, but the NPI device provides a lower per-port cost, Stitt claimed.

"The [Reduced Instruction Set Computing] processor-based bridging and switching in the Synernetics box is inherently more expensive than the hardware-based ASIC approach we employ," he said.

NPI is positioning EIFO as a complementary product to chassis-based and stackable hubs, Stitt said.

"By placing EIFO on top of a stack of 10Base-T work group hubs, a user can increase the bandwidth of the stack by 100M bit/sec and gain switched access to a server cluster supported by EIFO," he said. "EIFO essentially acts as a server accelerator."

EIFO can also be deployed in intelligent hub environments by connecting 10Base-T segments from existing hubs to an EIFO Ethernet port and connecting the EIFO FDDI port to the intelligent hub's FDDI backplane. "The user gains more bandwidth, but no cabling change or hub replacement was called for," Stitt said.

The product reflects an emerging market that will grow in strides, according to Paul Callahan, senior analyst at Forrester Research, Inc., a market research firm in Cambridge, Mass.

"The heady days of the big chassis-based hubs may be over because users want incremental bandwidth and they want it cheap," he said. "This type of product represents the beginning of something powerful by playing off the stackable craze and offering high-level performance at lower prices."

Pricing starts at $7,495 for an EIFO equipped with 12 10Base-T ports and a single-attached unshielded twisted-pair FDDI link. The dual-attached fiber connection version costs $8,995 and can be used in dual-homing configurations for added redundancy. EIFO will be available 60 days after receipt of order.

©NPI: (408) 321-7300.

FDDI-over-copper spec garners increased support

BY SKIP MACASKILL

Milpitas, Calif.

A group of at least 24 vendors will run an FDDI-over-copper interoperability demonstration at the INTEROP trade show next month in an attempt to instill user confidence in the technology.

The group is hoping to build on the momentum it established during a similar show of support in Boston last month when 13 companies came together to demonstrate the 100M bit/sec Fiber Distributed Data Interface technology implemented using unshielded twisted-pair wire on multiple vendor platforms.

"The FDDI-over-UTP standard is technically complete, so we want to show users at the show that vendors can and have built products that are interoperable," said Mitch Strobin, product-line manager at Network Peripherals, Inc. (NPI), one of the original 13 firms. He is also coordinator of the event.

Besides NPI, the initial group included 3Com Corp., Cabletron Systems, Inc., Codenoll Technology Corp., Crescendo Communications, Inc., Digital Equipment Corp., Interphase Corp., Micro Linear Corp., Motorola, Inc., Pulse Engineering, Inc., Silicon Graphics, Inc., SynOptics Communications, Inc. and Technitrol, Inc. Micro Linear will not be part of the INTEROP demo.

The more notable newcomers that will be part of the demo include IBM, Madge Networks, Inc., NetFRAME Systems, Inc., Optical Data Systems, Inc. (ODS) and Ungermann-Bass, Inc.

Two weeks ago, ODS said it will be offering hub modules for its Infinity intelligent hub and Desktop Network Interface cards supporting FDDI over copper through an OEM deal with NPI.

UB and NetFRAME are also expected to garner the technology from NPI, according to sources close to both companies. Within the next month, UB will integrate the technology into its Access/One intelligent hub in the form of a module, while NetFRAME will roll out an FDDI-over-copper adapter for its superserver line.

IBM will initially offer FDDI-over-copper network interface cards (NIC) from SysKonnect, Inc., which will also partake in the INTEROP demo. Madge Networks declined to comment on the speculation that it will be offering a NIC for that technology.

National Semiconductor Corp. has develop an FDDI-over-copper chipset that it will contribute to the demonstration, and three major cabling vendors will also participate: AT&T, Krone and Northern Telecom, Inc.

Rounding out the INTEROP group is adapter card vendor Eagle Technology, which is prepping an FDDI-over-copper NIC.

Alfa, Inc., a company that specializes in synchronous FDDI products, was planning to be part of the demo but pulled out when it could not meet the deadline for the hot staging this week. Alfa is planning to have an FDDI-over-copper product at the INTEROP trade show, according to Steve Cooper, vice president of the company.

In order to participate in the demonstration, vendors have to contribute $1,000 and pass muster this week at the Advanced Networking Test Center staging area in San Jose, Calif. The University of New Hampshire Interoperability Lab will supervise the event.

The demo will represent a full building net highlighted by a personal computer-based video application and a Unix-based demo that will include video and a large file transfer based on an X Window System application.

According to Michael Howard, president of Infonetics Research, Inc., a consultancy based in San Jose, the scope of vendor participation in the event should convince users that the standard is stable enough to invest in.

"The copper standard is here and vendors who have yet to announce product for it will do so very soon," he said. ◘

1992 25,000 FDDI adapters

According to Infonetics Research, Inc., about 25,000 FDDI adapters shipped last year. With the copper standard for FDDI nearly finalized, the figure is expected to triple - if not quadruple - this year.

BRIEFS

Continued from page 15

Fibermux Corp. appointed Bruce Brown president, replacing Steve Kim, who resigned to pursue entrepreneurial opportunities. Brown, formerly Ungermann-Bass, Inc. executive vice president of customer operations, will report to Bill Cadogan, president and chief executive officer of ADC Telecommunications, Inc., Fibermux's parent company.

Xyplex, Inc. announced that net sales for its second quarter ended June 30 reached $19.4 million, with net income of $2.4 million, or $0.39 per share. This represents increases of 44% and 33%, respectively, over the same period last year.

Belkin Components has introduced Compact MAU, an eight-port token-ring multistation access unit that offers all the features of an IBM 8228 as well as per-port link status and a reset button that simultaneously initializes all the lobe ports.

Available now, Compact MAU costs $499.

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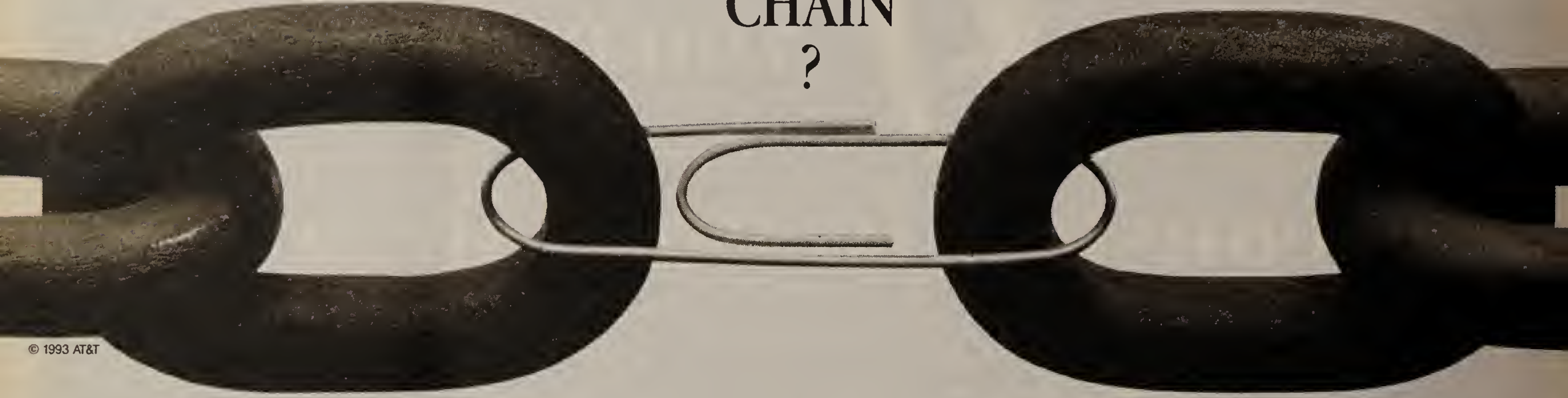

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AGENDA

Sunday	Registration	12:00 noon-7:00 p.m.
	Roundtables	2:00 p.m.-5:00 p.m.
	Reception	6:00 p.m.-7:30 p.m.
Monday	Registration	7:00 a.m.-6:00 p.m.
	Breakfast	7:00 a.m.-8:30 a.m.
	Sessions	8:30 a.m.-5:00 p.m.
	Reception	6:00 p.m.-7:30 p.m.
Tuesday	Breakfast	7:00 a.m.-8:30 a.m.
	Sessions	8:30 a.m.-5:00 p.m.

SESSION TOPICS

DISTRIBUTION CHANNELS

Establishing a Strong Distributor Channel, Hardware Vendor Alliances, Software Vendor Relationships, Relationships with Professional Services Firms, Telemarketing in the Face of VoiceMail

ADVERTISING/DIRECT MARKETING

Pacific Rim Direct Mail, Effective Database Development, Ad Campaigns on a Small Budget, Product & Company Launch Advertising, Multimedia as a Promotional Tool

INTERNATIONAL MARKETS

Eastern Europe as an Emerging Market, International Pricing Strategies, When to Go International, European Channels for Market Penetration, Product Launch and Distribution in the Japanese Market

PUBLIC RELATIONS

The PR Launch, Internal Communications Strategies, Effective Press Relations, Developing an In-house Publication: Editorial & Design Process, The Video News Release

PRODUCT MARKETING

Alternatives in Pricing, Managing the Launch Process, Trademarks and Patents, Product Positioning Case Studies, Competitive Positioning of the Underdog

TECHNOLOGY & MARKET TRENDS

European Market Trends, Object Technology and Architecture for Second Generation Client/server, Operating Systems Outlook, Trends in Client/server

EXECUTIVE BUSINESS ISSUES

The CIO Perspective: Understanding Your Customers, Building an Effective Marketing Organization, Understanding the IPO Process, Acquisitions: The Marketing Issues, Professional Services Business Strategies, Building a Strong Investor Presentation

If you register by August 6, you'll save $100 off your conference registration fee!

SUNDAY ROUNDTABLES

Software Marketing Perspectives will provide you with an opportunity to participate in an industry roundtable. Industry roundtables of 10 to 15 members will be formed by interest area with noncompetitive companies prior to the conference, offering participants an opportunity to engage in candid peer-to-peer discussions.

Join a Special Interest Roundtable by checking the appropriate box on the registration form, indicating which group you would like to join. You will be contacted to discuss your specific interests in order to match you to a group, and you will receive a letter confirming your participation.

OPTIONAL PRECONFERENCE EVENT

Sonoma Wine Country Biking Tour
Saturday, August 28
Depart at 8:30 a.m. and return at 5:00 p.m.

Whether you're a novice cyclist or an experienced pro, the casually-paced Sonoma wine country biking tour will be an exciting and fun way to see the famous Northern California wine country. With our own guide from Wheel Escapes, we'll bike first to Ravenswood Winery for a private tour and tasting, as well as a picnic lunch. We'll continue down the sleepy country roads and through the vineyards to Gundlach-Bundschu, then on through the eucalyptus groves to Buena Vista. And if you get tired along the way, we'll have a truck in tow to take you back.

Bicycles, helmets, water bottles, lunch, beverages, winery tours, tastings, and entrance fees, as well as buses to Sonoma, are all included in the $95 fee. Register for the tour by checking the appropriate box on the registration form and including the $95 fee with your registration check.

SPOUSES AND COMPANIONS

Spouses and companions are welcome to join us at the meals and Perspectives '93 receptions. You can register a guest by completing a registration form and including payment for the $175 fee. This fee covers the cost of all hosted meals and receptions.

MAKE YOUR PLANS NOW AND SAVE

Complete the registration form enclosed in this packet. One registration form must be completed for each person attending the conference. Please photocopy the form if necessary and return all completed forms, with a check made payable to Kawalek & Associates, to the following address:

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FEE STRUCTURE

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- Substitutions for paid registrants are permitted at any time.

FOR MORE INFORMATION

For more information regarding registration procedures, or to make substitutions or cancellations, please call Serena Tan:

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Software Marketing Perspectives '93 will be held at the San Francisco Sheraton Palace Hotel. Centrally located downtown and a landmark since 1875, the luxury hotel re-opened in April 1991 after a $160 million renovation and restoration. For guests who like to work out, the Sheraton has a complimentary health spa with a complete exercise room, whirlpool, sauna, and indoor lap pool.

The Sheraton is offering a special conference rate of **$135 per night for both single and double rooms** for Software Marketing Perspectives attendees. These rates commence three days prior to the conference and extend three days beyond its conclusion. A limited block of rooms has been set aside for the event, so please make your reservations early. Room availability cannot be guaranteed after August 6.

To make reservations at the Sheraton Palace Hotel, call the hotel directly. Indicate that you will be attending Perspectives '93. The hotel will send acknowledgement of your reservations directly to you. If you need to make changes or cancellations, contact the Sheraton Palace Hotel reservations desk directly:

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United Airlines has been selected as the official carrier for Perspectives '93 and is pleased to offer a 10% discount off the unrestricted BUA coach fare or a 5% discount off the lowest applicable fare, including first class (restrictions do apply). This special offer is available only to Perspectives '93 attendees and applies to travel on domestic and Canadian segments of all United Airlines and United Express flights in conjunction with this event.

To obtain the best fares and schedule information, you or your travel agent should call:

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1. Would you like to join a marketing roundtable meeting on Sunday? ☐ Yes ☐ No

(CHECK ONE)

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2. Will you attend the welcome reception on Sunday? ☐ Yes ☐ No

3. Will you attend the reception on Monday? ☐ Yes ☐ No

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Conference fees cover all handout materials, continental breakfasts, luncheons, coffee breaks, and evening receptions. Spouse/companion fees cover all hosted meals and evening receptions. Wine country biking tour registrants must pay the appropriate additional fees. Tour fees are not included in the early, standard, or spouse/companion fees.

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REGISTER TODAY

Debate rages over cellular technologies

BY ELLEN MESSMER

The first digital cellular services in the U.S. have inally arrived, but the industry battle over standards ontinues unabated, raising interoperability quesions for users.

Analog cellular providers have just begun the tranition to digital, which will support features such as lectronic mail and offer longer equipment battery ife. But arguments among the carriers over digital celular standards — the older Time Division Multiple ccess (TDMA) and newer Code Division Multiple ccess (CDMA) — have divided the cellular industry.

The user with a digital portable phone or car hone roaming across service areas could end up as he "innocent bystander" in the TDMA/CDMA battle ince TDMA equipment will not work on a CDMA ellular system, and vice versa.

As "dual-mode" standards, both TDMA and DMA will access analog cellular when digital serice is unavailable. Therefore, the schism over stanlards could force carriers to provide analog service vell into the future for interoperability reasons.

Digital cellular services have just been switched n. Southwestern Bell Mobile Systems turned on its DMA-based digital cellular service in Chicago just ays ago, weeks behind McCaw Cellular Communiations, Inc., which rolled out its TDMA service in lorida and the Pacific Northwest. McCaw will launch digital cellular service in New York and California within two months.

"We're completely committed to TDMA for several reasons," said Bob Ratliffe, vice president of communications at McCaw. "It's here today, and it works." Digital service will allow electronic mail and provide improved voice quality, he pointed out.

To get customers to buy a TDMA dual-mode device (see chart, this page) and select digital cellular service over analog, McCaw is pricing digital service at 20% below analog.

But other than McCaw, Southwestern Bell Corp., BellSouth Corp. and Nynex Corp., which has not committed to either standard, most of the other carriers are betting on the CDMA standard put forward by Qualcomm, Inc.

"We tested TDMA and CDMA, and in our experience, CDMA provides better voice quality," said Ed

See Digital, *page 24*

Digital cellular takes hold

Digital cellular mobile phones and portable handsets based on standard Time Division Multiple Access are now starting to roll out.

Vendor	Mobile	Portable
Hughes Network Systems	Now	4Q
Blaupunkt	Now	Now
Motorola, Inc.	Now	3Q
Ericsson GE Mobile Communications, Inc.	Now	Now
Audiovox Corp.	Now	4Q
Muratec	NA	3Q
Nokia Data Communications Corp.	Now	4Q
Oki America, Inc.	NA	3Q
Mitsubishi Electronics America, Inc.	NA	3Q
NovAtel Communications, Ltd.	NA	3Q
NEC America, Inc.	3Q	1Q, 1994

NA = Not announced

SOURCE: NORTHERN TELECOM, INC., NASHVILLE
GRAPHIC BY TERRI MITCHELL

CSX takes a Fresh Look to save $13.5m

Deal saves Tariff 12 user $4.5m annually.

BY BOB WALLACE

Jacksonville, Fla.

A series of shrewd negotiating tactics and advanced planning has paid off for CSX Technology, Inc. to the tune of $4.5 million in savings over each of the next three years.

The company has taken advantage of Fresh Look to restructure its AT&T Tariff 12 contract, consolidating its AT&T and MCI Communications Corp. traffic under a new three-year deal with AT&T worth roughly $30 million, a 29% savings over the rates specified in its original deal.

LE MON

Fresh Look is a Federal Communications Commission-mandated period due to expire July 29 during which AT&T Tariff 12 customers and others could terminate their network deals without penalty to take advantage of 800 portability.

CSX is just one of numerous AT&T Tariff 12 users that shopped around and got a better deal (*NW*, July 12, page 1).

Although CSX had an AT&T Tariff 12 custom network, its Sea-Land Services, Inc. subsidiary was covered under a special arrangement with MCI.

Last September, with 800 portability in mind, Sea-Land and CSX revised their MCI contract, adding a provision whereby the contract would expire on the day 800 portability began, said Jim Le Mon, a lead analyst for Sea-Land's strategic communications unit. That day turned out to be May 1.

CSX had a 3,500-site MCI Virtual Network to handle some voice traffic. Heavy voice traffic for more than 70 Sea-Land and CSX sites, as well as data requirements, were supported by CSXLink, a network consisting chiefly of private fiber, analog microwave and AT&T T-1, 56K bit/sec and analog multidrop private lines.

Sea-Land had also used an AT&T 800 number to let customers check the status of cargo, get shipping rates and track cargo movement.

The goal was to realize savings by

See Fresh Look, *page 24*

BRIEFS

Beginning this month, **Bell Atlantic Corp.** plans to waive onetime charges for customers reconfiguring or adding to their special-access networks. The company's four-month Network Optimization Window eliminates all nonrecurring charges for service installations, rearrangements or moves.

Ameritech's Illinois Bell Telephone Co. is offering discounts of $45 off the regular price of its Custom 800 Service. Customers can decide to have their Custom 800 service ring on existing lines without purchasing additional equipment or use a special line to receive toll-free calls.

GTE Mobilnet has swapped out older analog cellular switching systems for AT&T Autoplex System 1000 digital cell-site equipment in 36 cities nationwide. GTE Mobilnet said the conversion to digital, which allows faster call processing and the elimination of click tones, sets the stage for adoption of either the Code Division Multiple Access or Time Division Multiple Access cellular standard n the future.

PacTel Cellular and **US West Cellular** will conduct a field trial of Motorola, nc.'s Code Division Multiple Access digital cellular switching system in San Diego this fall, with 300 test participants using Qualcomm, Inc.'s dual-mode ortable and mobile phones.

AT&T has begun offering cellular signaling services to U.S. and Canadian cellular providers that improves network call processing, enabling customers oaming with cellular phones outside their service areas to use standard landne dialing between carriers.

Nynex Mobile Communications and SNET Cellular will begin field trials of e AT&T signaling service this fall.

Rolm software enhancement to give 9200 CBX new capabilities

BY BOB WALLACE

Santa Clara, Calif.

Rolm has announced a new software release that lets its 9200 CBX private branch exchange serve as an automatic call distributor (ACD) and work with ISDN Primary Rate Interface (PRI) services offered by AT&T and MCI Communications Corp.

The release, to be generally available in October, will enable users to configure the 9200 CBX as an ACD supporting as many as 50 call center agents. The switch's new ISDN PRI enables it to use automatic number identification with AT&T and MCI PRI services. Rolm hopes to add Sprint Corp.'s PRI service to its list, as well.

The new software also enables the switch to use an 800-service feature called Dialed Number Identification Service (DNIS).

With this service, the last four digits of the toll-free number called are sent to the call center, which aids in call distribution.

Rolm's 9200 CBX is targeted at small and midsize firms as well as large companies with branch sites that need to support as many as 200 lines.

Rolm also laid out specifications whereby personal computer-based ACD management information system programs can be tied to the switch. The PCs must run DOS 5.0, have an Intel Corp. 80486 microprocessor, 2M bytes of random-access memory and a 40M-byte hard drive.

Companies use ACD MIS packages to get an idea of how efficient their call center operations are. The Rolm requirements enable many companies to use existing PCs to run the packages rather than buying new ones.

ATTENDANT POSITION

Another feature, called Attendant Position, lets Rolmphone 400s or 624s act as attendant consoles in place of the more costly standard attendant consoles.

The switch's new Open Listening feature enables users with Rolmphone 300 or 600 series phones to continue talking through the handset while allowing others in the room to hear the conversation.

Yet another new feature, called Text Messaging, enables users to key in a message that appears on the display of a calling party's phone. The feature can also be used to send a message to a party that does not answer the phone.

The new switch software will be available on all 9200 CBXs shipped after October. List pricing for upgrades from older switch software will range from $1,000 to $6,000, depending on the 9200 CBX model and configuration.

✆ Rolm: (408) 492-2000.

PC-based voice response unit bows

BY BILL BURCH

Phoenix

Syntellect, Inc. last week announced Vocal Point I, a voice processing unit based on standard hardware that can handle advanced functions such as audiotex, paging, facsimile services and text to speech.

Syntellect has sold more than 6,800 of its Infobot voice processing systems, which run a proprietary operating system and are targeted at call-center applications. But to address smaller, department-level customers, Syntellect President Tom Mayer decided the firm would take an approach based on 486 personal computers with OS/2 and Dialogic, Inc. voice cards.

The Infobot line was designed to sit in between an IBM 3090 mainframe and a large automatic call distributor, said Craig Sparkes, Syntellect's marketing vice president. In contrast, the Vocal Point product works with private branch exchanges and numerous types of hosts via token-ring links or Systems Network Architecture/Synchronous Data Link Control lines.

Aside from targeting smaller operations, the Vocal Point box builds on Infobot's interactive voice response capabilities with the addition of advanced voice processing functions such as paging, fax services and text to speech.

The company is starting out with a basic version of Vocal Point running on an IBM ValuePoint machine that can handle four to 24 voice ports. Also available is a tower version running on an LX model of the Intel Corp. Xpress PC line that can take on advanced applications. Prices start at $17,000 for a four-port system and run up to $100,000. Syntellect also plans to introduce a rack-mounted version for call centers.

For voice processing, Syntellect is licensing IBM software that features a published application program interface. Syntellect also stuck with the standards-based approach by choosing Dialogic voice cards, the de facto industry standard for voice cards.

In the first quarter of next year, Syntellect will introduce its next-generation Vocal Point II, which will support a wider set of operating systems and hardware platforms, Sparkes said. For now, Syntellect plans to market Vocal Point only in the U.S. and will continue to sell its Infobot line here and overseas. Vocal Point I is available now.

©Syntellect: (602) 789-2800.

Digital

Continued from page 23

DeLong, director of net planning at Bell Atlantic Mobile Systems. His firm will launch a CDMA-based service for its Northeast market by mid-1994.

Whether they use CDMA or TDMA, carriers are drawn to digital cellular's increased capacity for calls over analog. CDMA, which just became a standard in July, promises to make more efficient use of spectrum by supporting 10 times the capacity of analog technology.

TDMA, which became a Telecommunications Industry Association standard about four years ago, supports three times the capacity of analog, although Hughes Network Systems is extending TDMA to match CDMA's capacity.

MULLINS

Ironically, the U.S. is migrating from one common analog standard to conflicting digital standards just as Europe has decided to move from diverse national analog standards to a single digital standard.

"We who have half the world's cellular users look like we don't know what we're doing," said Jim Mullins, director of networking for cellular products at Hughes Network Systems.

Inevitably, users will hear about the CDMA vs. TDMA vs. analog battle via carriers' advertising campaigns.

ROONEY

When its rival Southwestern Bell announced TDMA digital cellular service for the Chicago market this July, Ameritech's cellular division went on the offensive, calling TDMA inferior to its analog service and "unready for deployment."

TDMA did not deliver the triple call capacity as billed, said John Rooney, president of Ameritech's cellular division. The company, which still considers CDMA "a glint in the engineer's eye," is reserving judgment on which of the standards to endorse until they are further developed.

"I think it's sad they're not capable of providing digital cellular technology to their customers," countered Walter Patterson, Southwestern Bell Mobile Systems' director of marketing.

But many say it's sad that the U.S. telecommunications industry is split on the fundamental question of migration from analog to digital.

"With digital, North America has said, 'Let the best technology win,' rather than be bound by the first," said Ashok Trivedi, director of cellular planning business development at Northern Telecom, Inc. "It's hard to say if this will result in new services for users or a tower of babble."

Fresh Look

Continued from page 23

consolidating all those services under a single contract, Le Mon said.

The process began in July 1992, when a CSX request for proposal committee was created. The resulting RFP listed what CSX was currently paying for 90% of the network service it used. The only exceptions were services that were not offered by more than one carrier, such as a circuit between Sea-Land's Elizabeth, N.J., site and Moscow.

CSX sent the RFP to the Big Three as well as to WilTel and Cable & Wireless Communications, Inc. In December 1992, complete responses were received from AT&T, MCI and Sprint Corp.

AT&T offered a 5% discount off the existing rates, while MCI offered a 7% reduction, and Sprint pitched an 18% discount. Thinking that the carriers could do better, CSX rejected all three responses.

The company's strategy paid off. In January, CSX asked the Big Three to submit revised bids. AT&T and MCI each more than doubled their original discount levels to 12% and 15%, respectively, while Sprint pitched a 20% discount.

"Each vendor indicated that they would not lose the CSX business," Le Mon said. With that bargaining chip in mind, CSX again rejected all three bids.

In February, CSX gave each carrier different cost-reduction objectives to work their respective bids against, he said. For MCI and Sprint, the company took into account the approximate $1 million cost of converting its AT&T links. The goal for all three carriers was a 30% discount.

In March, the final bids were received. AT&T bid a 29% discount, while MCI offered a 32% reduction. Sprint dropped out of the running.

REGULATION

MCI reveals custom network details

BY BILL BURCH

Washington, D.C.

Compelled by a court order, MCI Communications Corp. has revealed details of its custom network deals that could give users new leverage in negotiating contracts.

MCI had submitted generic tariffs in February, but AT&T, as part of a pending lawsuit, won a court order forcing MCI to file more extensive tariffs (*NW*, Feb. 8, page 17).

In the tariff revisions filed with the Federal Communications Commission on July 16 and 19, MCI laid out the custom network contracts it offers for such services as virtual private networks, 800 service and conference calling.

The descriptions of MCI's custom networks — called special customer arrangements — detail four basic types of custom nets. Type 1 covers the widest set of services for the carrier's largest customers. Types 2 through 4 employ a smaller set of services, covering such basics as 800 service, virtual net service and conference calling.

Within the Type 1 category, MCI's tariff lists "options" that spell out contract details. Formulated as contracts for individual firms, the options now serve as models for other contracts.

With variations on volume discounts and other contract terms, the revisions are likely to provoke attempts at contract renegotiations by some MCI customers.

Also, some MCI customers are angry that the carrier filed the potentially revealing tariffs without first consulting with its customers, according to Brian Moir, Washington counsel for the International Communications Association. The tariff lists contract models stripped of information that identifies individual companies, just as AT&T's Tariff 12 custom network filings do. But the industry has long made a hobby of trying to match up filings' generic network service descriptions with individual companies' networks.

MCI lays the blame at AT&T's door for the revelation of any competitively sensitive information revealed in the tariff due to the court order. For example, MCI cites the instance of AT&T listing MCI customers by name in its request for the order.

"Customers are very upset with what AT&T has done," claimed William Erickson, legal affairs director for national accounts at MCI. "Customers were livid after the FCC filed a petition to reject the first [more generic] tariff."

As for MCI, its customers have been cooperative with information requests, and business is "booming," he said.

Despite the depth of the tariff revelations, AT&T has asked the FCC to reject the current filing. Among its charges, AT&T says some of the options are not generally available to customers, and new customers cannot sign up for vast portions of the tariffs.

A discount sampler for MCI custom network services

Option number (Type 1 network)	Minimum volume/month	Vnet discount	800 discount
9	$100,000	3.75%	7.75%
11	$100,000	3.75%	7.75%
13	$100,000	3.75%	7.75%
5	$120,000	2.25%	4.25%
2	$150,000	2.5%	6.5%
6	$150,000	3.0%	7.0%
8	$150,000	3.75%	7.75%
10	$150,000	5.25%	9.25%
3	$175,000	3.75%	7.75%
12	$200,000	3.75%	7.75%

Note: Discounts are given at minimum monthly volumes.

SOURCE: MCI COMMUNICATIONS CORP., WASHINGTON, D.C.
GRAPHIC BY TERRI MITCHELL

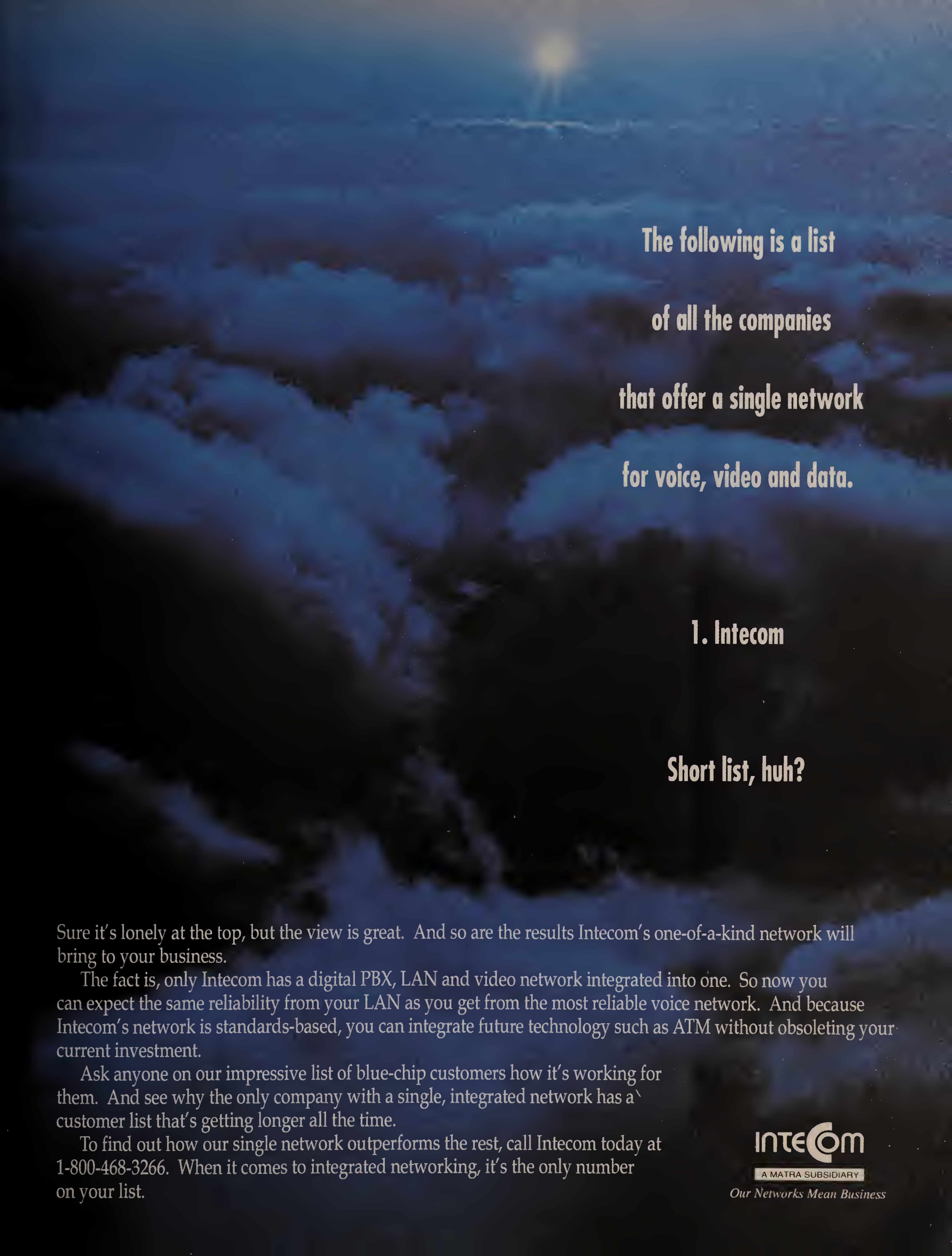
AT&T says contracts for Type 1, Options 2 through 20, and Type 2 and Type 3 are unavailable to new customers. However, MCI's attorney said the tariffs "were or are generally available in the marketplace, in full compliance with applicable legal requirements."

The U.S. Court of Appeals for the District of Columbia forced MCI to file the February tariff when it overturned the FCC's policy of exempting nondominant carriers from filing tariffs. MCI's February filing presented two generic deals for customers: a one-year contract for virtual network service and a one- to five-year contract for dedicated and switched services.

That order forced long-distance carriers other than MCI to file tariffs, as well, and the new order could cause companion carriers to file more extensive tariffs. For the most part, other long-distance carriers have followed MCI's lead in the February filings and entered generic service descriptions.

However, compliance is lagging among smaller companies, such as service resellers, traffic aggregators, operator and pay-phone service providers, and hotels that add surcharges to guests' phone bills. Also, the FCC is appealing the court decision that requires nondominant carriers to file tariffs.

AT&T has lawsuits pending against both Sprint Corp. and WilTel. Those companies and their customers face the prospect of having to file detailed tariffs on network services, although AT&T has not yet requested that the court order the filings.



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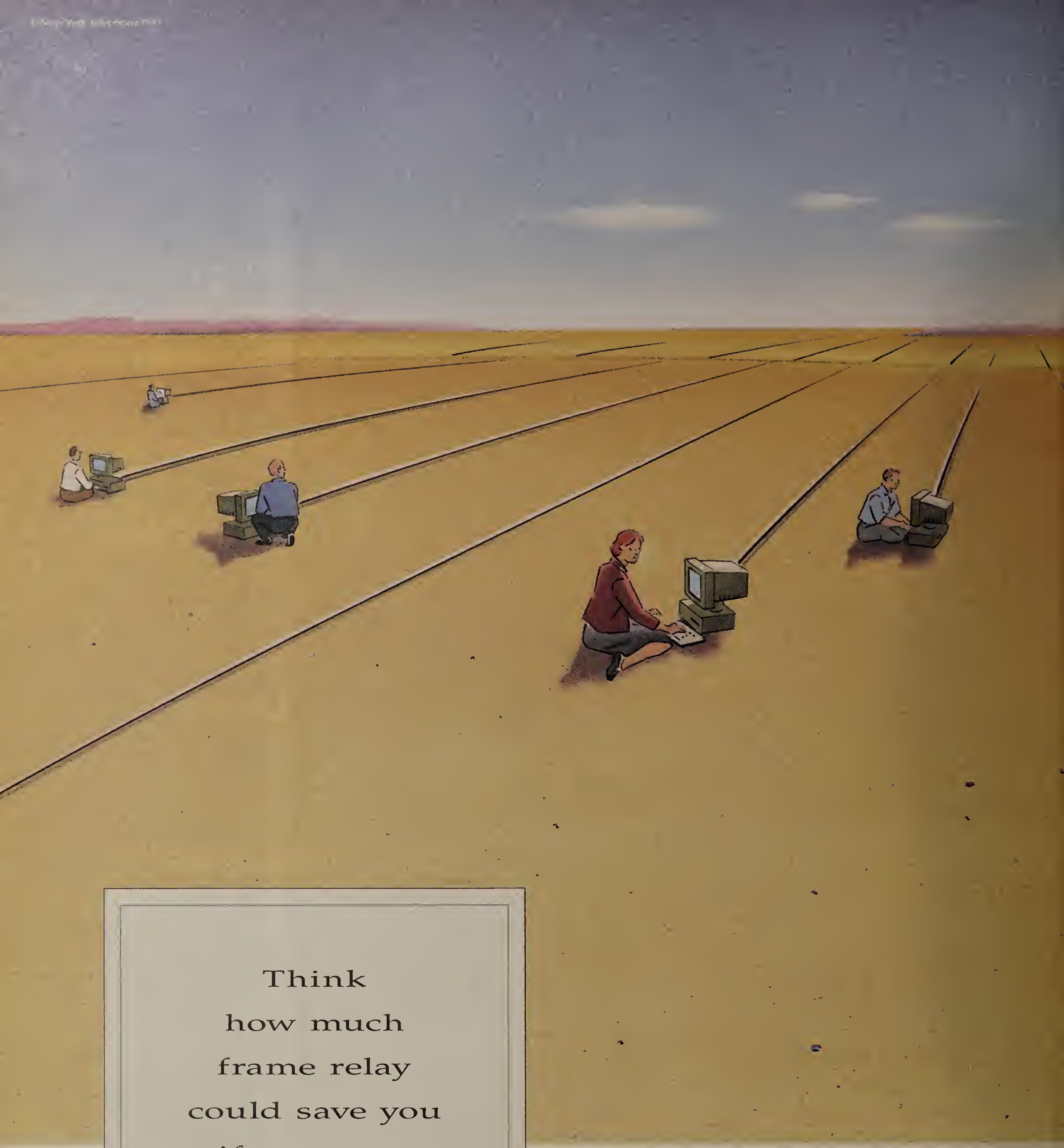

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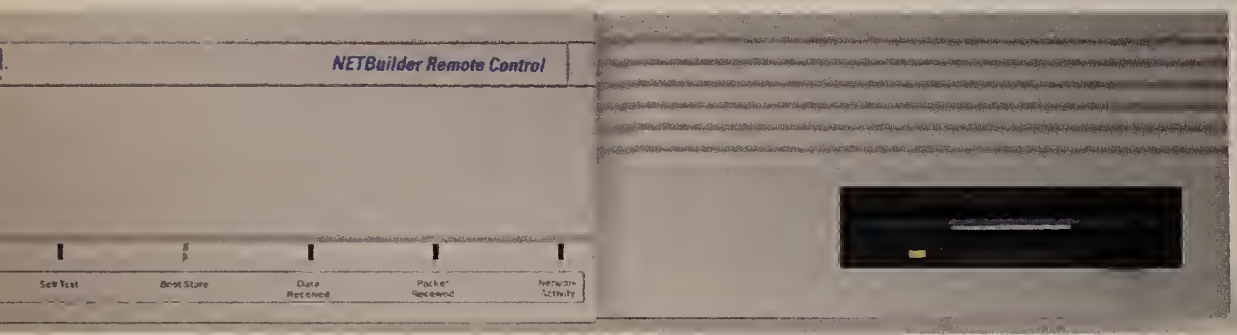

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BRIEFS

Powersoft Corp., a Burlington, Mass., client/server development tools vendor, reported revenue of $10.3 million for the second quarter, more than double the $4.3 million in revenue posted in the same quarter last year. Earnings more than tripled to $1.7 million from $483,000 in the second quarter of 1992.

Lotus Development Corp., a Cambridge, Mass., applications and messaging software vendor, posted revenue of $235.8 million for the second quarter, up 7% over $220.3 million in revenue for the second quarter last year. The firm reported a net loss of $4.7 million for the quarter, largely due to a $19.9 million charge against earnings resulting from its acquisition of Approach Software Corp. Lotus had earnings of $14.9 million in the second quarter of 1993. A Lotus spokesman said the company's communications business grew by more than 50% from last year, while Notes revenue showed "triple-digit growth," but he refused to provide specific numbers.

Informix Corp., a Menlo Park, Calif., database vendor, posted second-quarter revenue of $84.3 million, up 40% from $60.3 million in the second quarter of 1992. Earnings grew 33% to $12 million in the second quarter from $9.1 million in the corresponding quarter last year.

Sybase, Inc., an Emeryville, Calif., database vendor, posted second-quarter revenue of $96.3 million, 54% better than the $62.5 million it recorded for last year's second quarter. Earnings nearly doubled to $9.1 million from $4.6 million in the second quarter of 1992.

The **Information Technology Association of America (ITAA)** has published a book describing the technologies that software companies need to include in their products to be successful. *Emerging Software Technologies,* an 80-page book, focuses on multimedia, speech recognition, groupware, wireless data communications and other technologies. The views of high-level industry representatives, such as Lotus Development Corp. Senior Vice President John Landry, are included in the book. It costs $80 for ITAA members and $125 for nonmembers.

ITAA: (404) 442-9739.

Nexor, Ltd., a Nottingham, England, vendor of X.400 and X.500 software, will announce at INTEROP '93 August in San Francisco a Microsoft Corp. Windows X.500 user agent. The PC-Directory User Agent (DUA) offering will enable users to browse X.500 directories from an Intel Corp. 380386 or higher personal computer running Windows 3.1 and Winsock-compatible network software. Nexor already offers a Motif-based DUA, dubbed the XT-DUA. The PC-DUA costs $250 per user ($89 per user when 1,000 or more copies are ordered) and is available now.

Nexor: (011) 44 602 520 500 or (001) 44 602 514 600.

Developer stuck on new Oracle Glue API product

One firm already built two apps for customers.

BY WAYNE ECKERSON

Framingham, Mass.

In the expanding field of data access tools, Oracle Corp.'s recently announced Oracle Glue is one product that is going to stick around for awhile.

At least that's the opinion of Sam Gerace, president of PCX Consulting, Inc., a systems integrator in Pittsburgh that specializes in building cross-platform decision support and customer service applications.

PCX, which was an Oracle Glue beta user, has already built two applications for customers using the tool and will likely use it for at least half the customer applications it builds that involve an Oracle database, Gerace said.

"The magic of Oracle Glue is that on the client side it provides seamless integration with personal productivity applications, such as spreadsheets and word processors, and on the backend side it provides access to SQL databases, E-mail servers and palmtop computers," Gerace said.

Oracle Glue is an application program interface that is designed to be used with fourth-generation programming languages and macro and scripting languages used by spreadsheets and word processors. It enables end users to integrate their personal computer applications with data from SQL and non-SQL databases, electronic mail servers and palmtop computers.

The initial version of Oracle Glue, announced last November (*NW,* Nov. 9, 1992, page 1), works with Microsoft Windows applications and provides direct support for Microsoft Visual Basic 2.0 and Microsoft Excel 4.0. It supports other Windows applications through Dynamic Data Exchange

See **Oracle Glue,** *page 30*

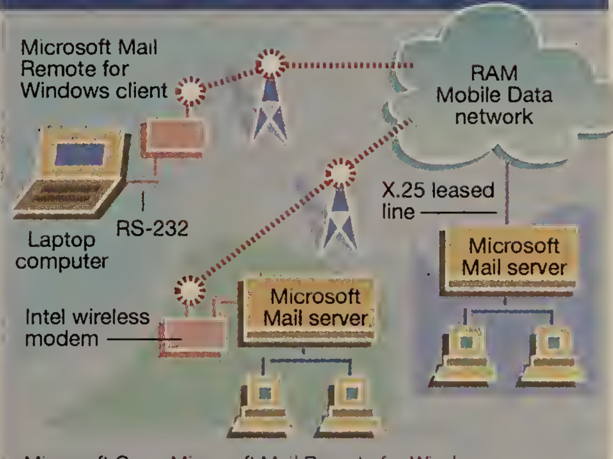
Three companies team to post Microsoft Mail

BY BOB BROWN

Microsoft Corp. last week said it has untethered Microsoft Mail users by giving them the ability to reach their local-area network-based mail servers via the RAM Mobile Data, Inc. wireless radio network.

Thanks to an agreement between Microsoft, Intel Corp., RAM Mobile Data and Microsoft Mail Remote for Windows will become the first Windows-based LAN electronic mail package with wireless support.

Microsoft Mail untethered



Microsoft Corp. Microsoft Mail Remote for Windows users can use the RAM Mobile Data, Inc. wireless network to access Microsoft Mail servers attached to the RAM Mobile Data net via a wireless connection or wire-based X.25 link.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INTEL CORP., HILLSBORO, ORE.

Microsoft Mail Remote for Windows, an existing client package for Microsoft's LAN-based Microsoft Mail, provides mobile or remote users with access to the same messaging features they are used to having in the office. Under the three-vendor agreement, Intel will provide the wireless modem to give users of the E-mail product access to the RAM Mobile Data net, which will provide connectivity to the user's Microsoft Mail server back at the office.

The only change required to let the Microsoft product work with the RAM Mobile Data network is a slight modification to the modem script that will be available on an Intel disk, said Jon

See **Microsoft Mail,** *page 30*

MAIL NETWORK MANAGEMENT

by David Ferris

The next hot topic

It's often said that local-area network electronic mail systems didn't scale well. A major reason is that messages have to make so many hops across interlaced LANs as they whiz from sender to recipient. When you hit around 2,000 to 5,000 mailboxes, chances are that mail is getting lost, or is experiencing mysterious, unpredictable delays.

Ensuring that messages get through in a timely way is a discipline known as mail network management. The subject encompasses:

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Configuration management. The ability to keep up-to-date information about the mail network and reconfigure it as necessary.

Problem solving. Detecting problems (hopefully before users become aware of them) and fixing them.

Performance management. Ensuring service guarantees are satisfied and optimizing transmission components.

Operations management. This covers things such as running message store backups, propagating directories, generating warnings when the mail system will be down and user chargeback.

Security management. Assigning and enforcing mail access privileges.

E-mail management is about to become a hot topic. Many organizations are committed to building large LAN-based E-mail systems and have started to encounter reliability problems. Several other factors will further emphasize the need for mail management.

Users will demand faster delivery. Today, a one-hour service guarantee usually suffices. During the next few years, many users will demand and receive five-minute turnaround.

Mail-enabled applications – where programs use the mail system to communicate – will proliferate, many of which, like order entry systems linked to manufacturing systems, will be highly valued by the organization.

However, management technology is in its infancy and we'll see a number of major developments over the next five years.

For one, E-mail vendors such as Lotus Development Corp. and Microsoft Corp. will get involved.

Second, today's message-routing software requires tables to determine which path a message should take. These tables are time-consuming to maintain and easy to bungle. Vendors will develop products to help ease the hassles.

And third, management will be integrated with mainstream network management environments, such as Hewlett-Packard Co.'s OpenView. ◻

CLIENT/SERVER

Getting to the bottom of stored procedures

BY PETER LISKER

In the client/server database environment, there are a number of features that are considered "check-off" items for managers when selecting a database product. One of the most important of these is the capability to run stored procedures.

Simply put, a stored procedure is a piece of database code — usually SQL — that executes at the server after being invoked from the client workstation. The resulting data is returned to the requesting client, where it is used by the client application.

Stored procedures can be a valuable part of crafting an efficient client/server application, and from the network manager's standpoint, they can bring enormous benefits to the networked environment. One common misconception is that stored procedures are the same as remote procedure calls (RPC). In fact, the RPC is a very different beast.

Client machines use RPCs to call for server database processing, for example, passing a message along with necessary database-specific parameters to initiate the desired processing for execution at the server. In essence, the RPC is the mode of communication between the client and the server, while the stored procedure is the actual database code that is run.

This method of processing is at the heart of client/server methodology, isolating the application's front-end client from the back-end database "crunching," done more appropriately at the server. From the net manager's perspective, using stored procedures can help increase net throughput and utilization.

The primary benefit is that instead of a client application sending the entire block of SQL code, the application sends an RPC with the necessary parameters for data identification and use. The bandwidth saved is then freed up for use by other applications.

Another key benefit of the stored procedure approach is that it is network- and protocol-independent, thus isolating applications from being dependent on a specific network topology and technology. Because the server is responsible for such common database tasks as data validation, there is no need to duplicate such code on every client machine, as is the case in a non-stored procedure environment.

All major vendors now offer stored procedures, but there are significant differences in the functionality and flexibility of their implementations. Important considerations include the ability to write structured code in the stored procedure, which involves using distinct software modules for various tasks, and to nest multiple levels of stored procedures.

Here, nesting refers to stored procedures being able to call each other and pass necessary parameters and status codes back and forth. Some vendors only offer one level of nesting — from client to server — or restrict the actual data that is passed between them.

Even more critical is the capability to detect errors and roll back a transaction at any point in the process. One of the keys to modern relational database efficiency is that you do not have to rely on the front-end programs to do transaction control; the database manages the business rules and basic relational integrity for the client applications. It is critical that the stored procedure implementation not violate this fundamental principle.

Stored procedures can be a valuable tool in the arsenal employed in creating innovative, efficient client/server systems. But users need a high level of knowledge and perseverance to determine whether they really offer all the features needed in a specific environment.

Malcolm Colton, director of product marketing for servers at Sybase, Inc., provided background information for this story.

E-mail service providers to simplify X.400

BY BOB BROWN

El Segundo, Calif.

A group of electronic mail service providers hopes by year end to start a pilot test of a simplified X.400 service that would eliminate the need for users to designate a carrier in the recipient's E-mail address.

ROWE

The U.S. National Message Transfer Service (US-NMTS) Implementors Group, formed last December by seven service providers, is seeking to make the different carriers' interconnected nets look like a single, seamless X.400 net to end users.

The group met recently here to start planning the pilot and to draft a memorandum of understanding for the group's members in addition to a technical requirements agreement.

At the meeting, the group ran its ideas past a handful of E-mail software vendors, whose products will need to support whatever specifications the group defines. These vendors included Lotus Development Corp.'s cc:Mail division, Digital Equipment Corp., Hewlett-Packard Co., OSIware, Inc. and Retix.

The US-NMTS hopes to make addressing an X.400 message more like dialing a long-distance number in that the person initiating an exchange will not need to know the intended recipient's carrier, according to Gary Rowe, a principal at the Rapport Communication consultancy in Cincinnati and chairman of the US-NMTS group.

When sending messages over an X.400 net, users will be able to leave a blank space where the carrier's name would typically belong in an X.400 address. The carriers will figure out which one of them should handle the call, he said.

Addressing is only one of many issues that carriers need to tackle in order to deliver a seamless end-to-end X.400 service to users, Rowe said. Among other things, the carriers will need to agree on quality of service levels, relaying messages across more than two carriers and international connectivity issues.

The US-NMTS group plans to discuss its pilot plans in detail at its next meeting Sept. 27-29 in Reston, Va. At that time, the group will probably determine exactly when the pilot will take place.

For more information, call Rowe at (513) 779-8750 or a member of the US-NMTS group.

U.S. National Message Transfer Service Implementors Group members:

- Advantis
- AT&T EasyLink Services
- BT North America, Inc.
- Infonet Services Corp.
- MCI Communications Corp.
- Pacific Bell
- Sprint Corp.

Oracle Glue

Continued from page 29

(DDE) and Dynamic Link Libraries.

On the back end, Version 1.0 supports Oracle6 and Oracle7 relational database management systems, IBM's DB2, Sharp Wizard palmtop computers and Oracle*Mail 1.1 E-mail servers. The next version of Oracle Glue, due out by year end, will support Macintosh clients. Future versions of Oracle Glue will support Novell, Inc.'s Message Handling Service (MHS), Microsoft's Open Database Connectivity, Apple Computer, Inc.'s Newton palmtop, and a variety of client and server platforms.

GERACE

Besides providing support for E-mail and palmtops, Oracle Glue offers a couple of advantages over other Windows-based data access tools, Gerace said. First, commands remain consistent across client application environments, making Oracle Glue portable across different operating systems and high-level programming languages. Second, it enables users to access back-end data without ever leaving their spreadsheet or word processing application.

But Oracle Glue does have its limitations, he said. Except for Microsoft Excel, Oracle Glue integrates with Windows applications via DDE. This requires users to know how to use DDE, which is not so intuitive, Gerace said. Also, the initial version of Oracle Glue only provides access to one other database — DB2 — besides Oracle's own SQL database.

"The promise of Oracle Glue will be achieved when it connects to data sources other than Oracle databases," Gerace said.

So far, PCX Consulting has used Oracle Glue to build a field data collection application for a public utility and a remote customer service application used by salespeople at a manufacturing firm.

In the first application, energy management specialists visit homes to recommend steps customers can take to reduce energy consumption.

The specialists use Sharp Wizard palmtop computers to collect more than 300 pieces of data about the customer's home, usage patterns and conservation efforts.

The data is then uploaded via a modem connection to an Oracle database at the home office where it is integrated with billing and customer information. This allows the utility to print monthly bills that detail the amount of energy and money the customer has saved due to conservation efforts.

"Oracle Glue enabled us to build a prototype in six days and a production application in two weeks," Gerace said.

PCX had to write only 1,000 lines of code to integrate the Sharp Wizard application with the Oracle database, he said, far fewer than the several thousand lines of code it would have taken without Oracle Glue.

In the second application, a manufacturing firm is equipping its salespeople with laptop computers running Windows-based spreadsheet and word processing applications.

Oracle Glue enables the salespeople to access data from an Oracle database on their laptop computers without ever leaving their application. This allows the salespeople to compose proposals, check inventory and obtain customer information while meeting with a customer.

The local Oracle database is refreshed with up-to-date data from a central Oracle database whenever the salespeople dial in to the home office.

"The company feels the sales application — which was made possible by Oracle Glue — gives it a competitive advantage," Gerace said.

E-mail

Continued from page 29

Goodman, manager of product marketing for Microsoft's Connectivity Business Unit. "We wanted to come up with a way for mobile users to always be in touch without constantly being in search of a phone," he said.

An E-mail administrator at one large Microsoft Mail account who asked to remain anonymous was glad to see Microsoft adding wireless support and approved of its partners. "But I have haven't seen much demand for wireless connectivity here yet," the user said.

The announcement follows on the heels of RAM Mobile Data and Intel's recent agreement with Lotus Development Corp.'s cc:Mail division, under which users of cc:Mail's DOS-based product will be able to exchange messages using RAM Mobile Data's wireless net and Intel's AT-compatible wireless modems (*NW*, June 21, page 6). Intel is reselling Ericsson GE Mobile Communications, Inc.'s wireless AT-compatible modem.

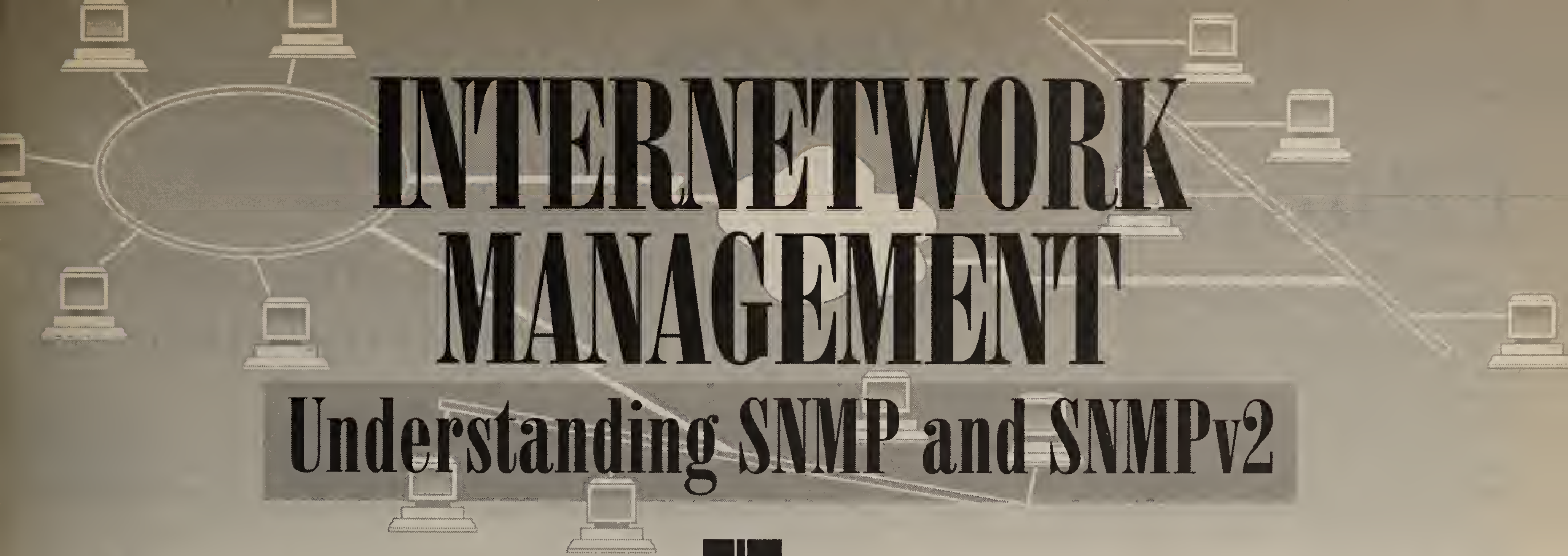
Support for Microsoft Mail Remote for Windows is consistent with RAM Mobile Data's broad strategy to make it easier for users' existing applications to work with the RAM Mobile Data net, said Martin Levetin, senior vice president of wireless messaging at the firm.

According to Andy Seybold, editor in chief for the monthly newsletter "Outlook on Mobile Computing," based in Boulder Creek, Calif., wireless support for Microsoft Mail should "give the wireless E-mail market a jump start by making it easier to do."

The Intel wireless modem is available via phone orders now and will be available through Intel's retail channel by September. The modem costs $747.

RAM Mobile Data is offering unlimited access to its net for $75 a month until year end. For Microsoft Mail Remote for Windows users, RAM Mobile Data is offering the first month free and will waive the usual activation fee.

©Intel: (800) 538-3373.



INTERNETWORK MANAGEMENT

Understanding SNMP and SNMPv2

According to IDC (International Data Corporation), the installed base of internetworking devices has been growing at an average annual rate of over 65% for the past four years.

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- Learn the details of the three key elements of the Internet Network Management framework: the SMI, the MIB and the SNMP.
- Survey the key elements of Abstract Syntax Notation One (ASN.1), the language used to define SNMP message formats.
- Understand how TCP/IP and the related Internet protocols such as UDP and IP support SNMP.
- Learn how test equipment that supports the Remote Monitoring (RMON) MIB can assist with distributed LAN management.
- Understand the enhancements found in SNMPv2, such as Manager-to-Manager communications, the GetBulk Protocol Data Unit, and enhanced Security.
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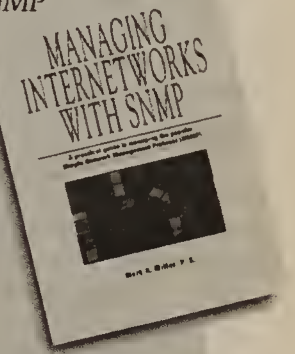

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Editorial

Virtually every day we're treated to new stories about how one or another of the big media, computer/communications or entertainment companies is positioning itself for the multimedia future.

We're talking major players here — IBM, AT&T, Apple Computer, Inc., Time Warner, Sony, the RBHCs — all looking to take the lead in delivering new services I'm not sure we want. I'm not at all certain how my life will be enriched by 500 cable channels.

Personal reflections aside, all this activity has generated debate among editorial staffers on just what impact these developments will have on our readers and how extensively to report on them.

Some view it as Sturm und Drang — a lot of grandiose posturing about new ways to keep the MTV generation entertained that doesn't hold much significance for our readers.

To some extent, I agree. Most of the services the corporate giants are crowing about are consumer-oriented and won't reach us for the better part of a decade, if at all.

But all this smoke should be triggering alarms in the minds of network executives. Whether you'll be able to order movies on demand or transfer funds from your Nintendo machine is irrelevant, professionally speaking. Hype aside, these companies are talking about providing a new communications infrastructure through which your company can reach customers — new ways to market, deliver and support your products.

Case in point: Video-on-demand services won't just let you call down *Ishtar* in a weak moment. They could enable you to deliver a product demo video to customers who have read or viewed an advertisement for your wares.

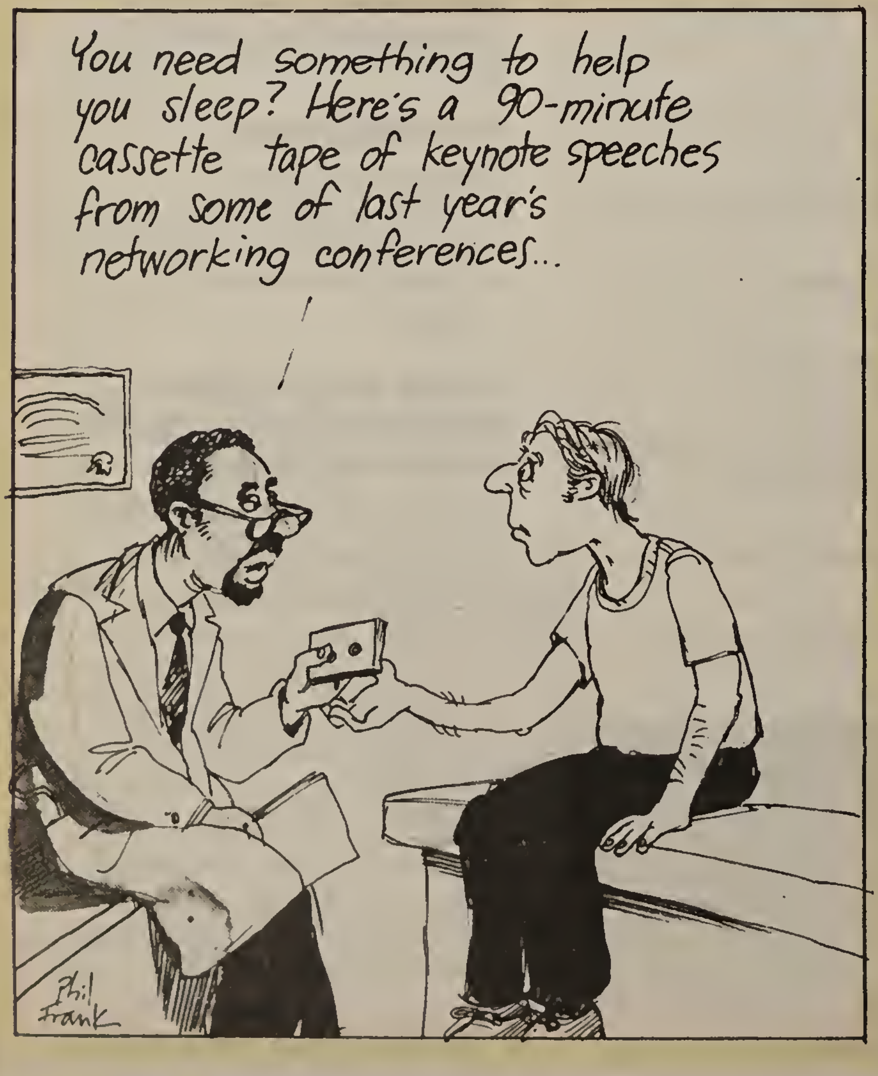
While you're reading about the trials and experiments the cable companies and carriers are launching, and while you're hearing the reports about the exploits of media giants such as Time Warner, you ought to consider how you can exploit these developments for your company. The communications world is changing rapidly, and the smart players will be looking today at how to partner with new providers to deliver products and services tomorrow.

But all that presupposes an answer to the earlier question. How much coverage should we be devoting to this convergence of computing, communications and entertainment? Let me know what you think.

➺ JOHN GALLANT

Teletoons

FRANK AND TROISE


You need something to help you sleep? Here's a 90-minute cassette tape of keynote speeches from some of last year's networking conferences...
Phil Frank

PUBLIC NETWORKING

By Mary Johnston Turner

LANs, not PBXs, will anchor user ATM implementations

Users trying to craft long-term Asynchronous Transfer Mode (ATM) evolution strategies shouldn't bet the farm that private branch exchanges will displace emerging ATM LAN switches as the anchors of future integrated voice/data networks (*NW*, April 19, page 1).

PBX vendors discount competition from local-area networks, saying LAN manufacturers know nothing about voice processing and will, therefore, be unable to compete as a platform for desktop multimedia networking. However, in working with early ATM adopters, manufacturers of ATM customer premises equipment and service providers, I see hubs and backbone switches geared to LAN-based network architectures as the hands-down winners for real-life ATM implementation.

Trade journals have been full of stories about users, vendors and carriers that are taking the LAN-based path. For example, Hughes Aircraft Co., featured in *Network World* for its ATM procurement activities (Feb. 8, page 1), is seeking to link site LAN hubs and campus LANs and metropolitan-area network hubs using ATM wide-area services.

Vendors such as SynOptics Communications, Inc. and Fore Systems, Inc., which will have ATM equipment available this year, are working hard to implement ATM for LAN-oriented network systems. Carriers are intimately linking ATM services to their data network strategies and management tools. Leading vendors and users plan to use these LAN-based systems not only for data traffic but also for voice and video.

In a cell-based ATM world, all types of communications — voice, data, image and video — look like bursty LAN traffic. Therefore, the role of circuit switching, which is dominated by PBX vendors, becomes less vital for desktop multimedia networking. While the role of the LAN expands, PBXs, by comparison, have not shown any evidence of being able to elbow LANs out of the heart of data network architectures.

PBX supporters argue that ATM PBXs will replace LAN-oriented architectures as multimedia applications replace basic data applications in the role of the network centerpieces.

PBX vendors point to their well-known expertise in call control and call processing software as a barrier that ATM hub vendors cannot surmount as soon as multimedia makes the big time. These PBX vendors seem to believe that, despite the fact that users have been moving off big, central, expensive computers as fast as possible, they will be willing to continue to rely on big, central, expensive switching systems in the future.

Instead, I see a different model emerging that leverages distributed computing and low-cost servers. In this model, voice call processing will migrate onto LAN servers and personal computers will support telephone handset functions as multimedia is delivered over the LAN.

Compressed video services that are based on emerging Motion Picture Experts Group and Joint Photographic Experts Group standards will generate bursty data traffic rather than a continuous bit stream as they do today.

Networks fitting this model will be built from fast, relatively dumb and definitely inexpensive cell-switching hardware that supports basic-level routing and network services in silicon.

Users will invest in numerous servers that control internetwork routing, voice call processing, video services and related value-added communications services necessary for multimedia. The PBX will be downsized to the point where it is a call server, managing the addressing and routing of voice traffic over the LAN.

This model will rely on LANs to provide access to a public network that interconnects multiple public and private ATM networks, much the way the Internet provides interconnection between public and private research networks.

Domain addressing and X.500 will become more important than traditional phone numbers. Users will have the choice of asking public networks or private customer premises equipment to handle the conversion of different multimedia application formats — such as video and graphics — between different systems, although standards will largely make this unnecessary.

For users likely to buy a PBX in the next few years, this LAN-based model presents some important investment timing decisions. During the next 24 months, a great deal of development is expected on ATM and multimedia standards, products and services, including embryonic call servers. By early 1995, the picture of how well and how quickly voice will complete the migration to the LAN will be much more clear.

Users that can get by with upgrades to their existing PBXs during the next two years may find themselves well positioned to migrate rapidly to desktop multimedia and ATM services with a minimum of undepreciated expense.

Users that must make a PBX investment decision today should take steps to depreciate their investment aggressively. On a typical seven-year depreciation schedule, today's PBX won't be replaced until the year 2000, a point at which leading users will be well on their way to multimedia and ATM.

Users considering LAN investments should begin now to prepare for voice on the desktop and multimedia, including video, on the LAN. Specifically, this means investing in Level 5 unshielded twisted-pair wiring, which should be able to accommodate desktop ATM services in the 30M to 50M bit/sec range. It also means developing and implementing a well-documented network architecture that identifies how various communications servers will be integrated into the basic switching and transmission framework.

Finally, LAN management investments must be beefed up to become true enterprise management tools capable of supporting the complex environment expected by 1995.

➺ Turner is a principal with Northeast Consulting Resources, Inc., a Boston-based consulting company working with leading-edge users and vendors of information technology. She can be reached at (617) 570-0790 or via MCI Mail at 384-0973.

USER FORUM

By Douglas Welch

Novell: Make CNE affordable

The high cost of becoming a Certified NetWare Engineer (CNE) is preventing many otherwise qualified applicants from obtaining this training and advancing their careers.

Despite the recent debate over the CNE certificate's worth *(NW,* March 8, page 46; March 29, page 41), it is becoming the minimum hiring standard for local-area network administrators.

Yet in these recessionary times, getting a CNE certificate is just too expensive for many network staffers and the companies that employ them.

According to my local Novell training center, the average cost of becoming a CNE today, including classes, books and test fees, is approximately $6,300. While large companies might not flinch at providing this sum for staffers, many college students and other newcomers to the networking industry find this burden unbearable.

Despite newcomers' desire to broaden their careers, financial considerations block the way.

Likewise, network managers at small companies are finding it difficult to budget the high cost of training even one staff member. Times are hard, and training is usually one of the first budget items to be cut.

Most firms feel that if the network is already working, there is not reason to spend a lot on training network staffers.

Instead of allowing the CNE program to become an exclusive club for deep-pocketed, corporate network managers and their staffs, Novell, Inc. should reach out to those people who spend their day actually making networks run.

These people are the ones who will allow Novell to expand its market and successfully introduce new products. And it is these people who decide which network operating system to use.

And if they find the CNE program too expensive, they will not take the classes, forget about getting certification and possibly even turn to other networking alternatives, rather than one from Novell, to get the job done.

CNE training will be an even more valid hiring requirement if there is equal opportunity for all who want it. With the release of NetWare 4.0, the need for CNEs will increase so much that demand may exceed the current supply.

Based on my personal experience, there seems to be a shortage of CNEs. Although my company considers the certificate a criterion for most of the jobs it advertises, it usually ends up having to hire knowledgeable but uncertified people and pay for their training.

The adoption of NetWare 4.0 at many sites will only exacerbate this situation. NetWare-based companies need certified people today, and they shouldn't be expected to grow their own — at least not at such an expensive rate.

One possible solution is for Novell to provide CNE training as part of a college's computer science degree program. Through supplemental CNE courses with reasonable fees, students would graduate with a basic knowledge of networks and NetWare.

This would provide businesses with candidates that have training in some real-world systems instead of a theoretical background in the rapidly shrinking world of systems programming. Additionally, including CNE training in college programs would allow students to use traditional financial aid sources and amortize the cost of the CNE over several years.

Another solution would be for Novell to offer CNE courses at a lower fee through traditional trade schools. The infrastructure of classrooms and equipment is already in place. All that is needed is a trained teaching staff, supplies and a schedule.

Instead of using CNE certification as a cash cow, Novell should be helping companies develop a well-trained work force to support its products. The high cost of CNE training could backfire on Novell by forcing users to explore alternative products.

It is time for Novell to remove the financial roadblocks to CNE certification and get NetWare users back on track.

◆ Welch is a support analyst for a major entertainment corporation in Los Angeles. He can be reached via the Internet at dwelch@qedbbs.com.

Letters

Hitting home

Richard Finkelstein's recent opinions piece on Windows (July 5, page 32) really hit home here.

Mr. Finkelstein's point is exactly on target: Windows is OK for running games, spreadsheets and writing letters at home, but it is a farce as a vehicle for reliable enterprise net applications. We have to allocate crude chunks of time and money for "unexpected Windows instabilities" when we beta-test, pilot or implement new Windows-based net features.

What a shame! Microsoft Corp.'s Bill Gates could have made just as many billions of dollars by marketing two solutions: a wimpy DOS upgrade path that would stay backward-compatible and a state-of-the-art Windows path.

George Nease
LAN administrator
Boeing Computer Services Distributed
Computing Support - 777
Everett, Wash.

Hitting home II

As a new *Network World* reader, I enjoyed Richard Finkelstein's column in the July 5 issue.

I haven't come across anyone being quite so frank about Windows. It's clear that Mr. Finkelstein has sigificant insight into the product and offered alternatives to consider, such as Unix and OS/2. But I would be interested in his opinion on Apple Computer, Inc.'s System 7 and Apple's upcoming Apple Open Collaboration Environment efforts.

Mark Ware
Site software analyst
Data Systems Analysts, Inc.
New York

Editor's note: Will do.

CORRECTION: In providing information for a chart accompanying the Buyer's Guide to Network Management Platforms (July 5, page 42), Cabletron Systems, Inc. inadvertently omitted the fact that it provides an element management application that enables its Spectrum 1.1.3 product to manage intelligent hubs.

Hype-notic suggestion

Regarding Asynchronous Transfer Mode (ATM) coverage: I think there's too much vendor hype, period — ATM included.

It's hard to find articles that put things into perspective for users these days. Unless they do, who has the time to read them?

Vickie Rosenbusch
Director of information systems
Fruehauf Trailer Corp.
Detroit

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Contacting us early in the process will help us determine the focus of the Buyer's Guides and compile the list of vendors that should participate in the survey.

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Routers	Sept. 27
Videoconferencing	Oct. 11
Remote LAN access	Oct. 25
T-1/T-3 multiplexers	Nov. 8
SMDS services	Nov. 29
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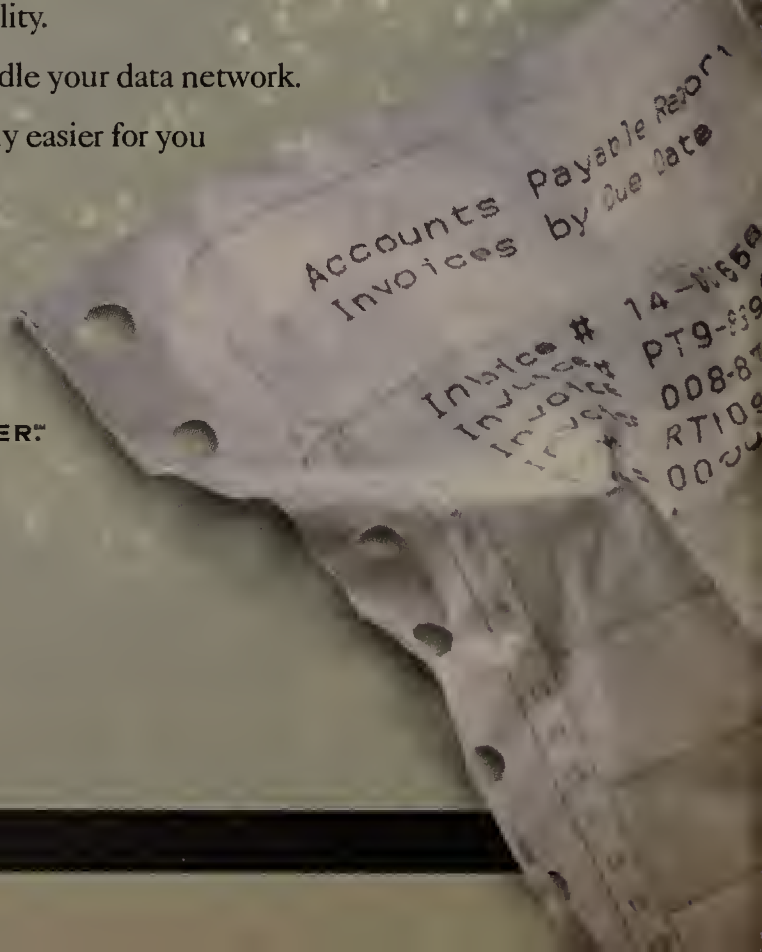

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Somewhere over the rainbow

By JAMES PRUITT

Users are turning to multiprotocol backbones in their continuing search for networking riches.

Somewhere at the rainbow's end lies buried a pot of gold that many have searched for but never found. Network managers can surely appreciate the futility of those efforts, their search for the most appropriate backbone netwoking technology often turns up the same result.

Just a short 10 years ago, users such as the Bank of America looked forward to private T-1 networks as the surefire thing to meld separate voice and data nets together for the long haul. At the time, the bank was saddled with one string of low-speed analog circuits to support teller terminals in more than 1,200 branches and another to support over 2,000 automated teller machines. Voice traffic was routed over yet another mishmash of circuits in the public network.

The emergence of T-1 multiplexers enabled the bank to place traffic from those separate nets onto a single high-speed circuit. The result was elimination of costly duplicate circuits and the ability to route voice traffic, which accounted for 70% to 80% of overall traffic, more cheaply than carriers could. Yet it forced the bank to carve out separate channels on the T-1 circuit to not only segregate voice from data, but also to ensure that the different protocols supporting teller terminal and ATM traffic would not be mixed together.

Like many other companies, the bank thought it had the elusive prize in hand when the rules of the game changed. Today, personal computers and interconnected local-area networks are replacing or complementing traditional terminal-to-host setups. And attractively priced and more functional carrier services are wooing voice traffic back to the public network.

Now many users such as the Swiss Bank Corp. find themselves back at square one with separate internetworks supporting a single protocol such as Transmission Control Protocol/Internet Protocol or Novell, Inc.'s Internetwork Packet Exchange (IPX). Swiss Bank is collapsing multiple internets into a single backbone anchored by routers that mix various protocols over a single slice of bandwidth.

The move will reduce expenses by rationalizing several logical networks into one physical one. David Pao, director of network technology at the bank, together with Wellfleet Communications, Inc., designed a Swiss Bank network with seven routers connecting offices in Los Angeles, Miami, New York, San Francisco and Toronto. The network, currently in Phase I, supports IBM Token-Ring traffic. Additional phases will add TCP/IP and IPX, as well as cover an additional IBM Systems Network Architecture network.

Because LAN protocols are packet- or datagram-based, routers today can transmit different protocols on the same circuit at full speed. To oversimplify, they just transmit one packet after another in burst mode.

The major exception to this so far has been uncovering a way to mix IBM SNA traffic on the same backbone as LAN protocols. SNA has very different requirements than most LAN protocols, such as its requirement for a a very deterministic response time. Terminal-to-host sessions are lost if terminals do not respond to host polls within a given time, and most multiprotocol rout-

Continued on page 36

Continued from page 35

ers can't yet guarantee the type of deterministic response time that SNA requires.

But some router vendors are taking their best shot at correcting this situation (see story, page 37). In addition, IBM itself is rolling out Advanced Peer-to-Peer Networking, which is a more routable protocol than SNA.

There are other factors driving users to install multiprotocol backbones, says John Morency, principal consultant at Strategic Networks Consulting, Inc. in Rockland, Mass. Router vendors are finally able to deliver near-fault-tolerant equipment that can address the availability requirements common to enterprise backbone networks. Furthermore, companies such as Cisco Sytems, Inc., CrossComm Corp. and Wellfleet have announced a new class of high-end routers capable of forwarding up to 400K packet/sec, which is as much as 25% faster than previous offerings.

Users today are implementing multiprotocol backbones in three distinct theaters: local area, metropolitan area and wide area. Each theater presents a different set of challenges in network design, congestion control and address management. The problems encountered at the local area do not disappear as the network becomes more widespread; they accumulate.

LOCAL MULTIPROTOCOL NETS

At the local level, the early solution has been to use distributed backbones comprising a series of interconnected routers to shuttle traffic between LAN segments. But as more powerful routers become available and the marginal cost for adding more ports declines, the collapsed backbone or single-router solution is becoming more economical.

In a collapsed backbone, all LAN segments are connected to a single router, which uses its backplane bus to switch traffic between segments or even to wide-area circuits.

In most collapsed backbone designs, LAN segments are cabled in a star configuration to intelligent hubs, which conforms to the cabling systems already in place in most buildings. Hubs can be located in existing wiring closets, and most sport adapter cards that support both Ethernet and token-ring.

Individual hubs are connected to Ethernet or token-ring ports on the backbone router via a building's distribution cabling, such as coaxial or fiber-optic cable.

The collapsed backbone not only reduces cost compared to using several smaller, individual routers, but it also simplifies operations. The single router is often placed in a central location staffed with technical personnel that can respond to problems as they occur.

Collapsed backbones work well in new buildings where the required cable connections can be designed into the infrastructure. In older buildings, interconnection between hubs in wiring closets and a central operations area may be more of a problem. Building modification and cabling costs may offset the cost advantage of a single router in some cases.

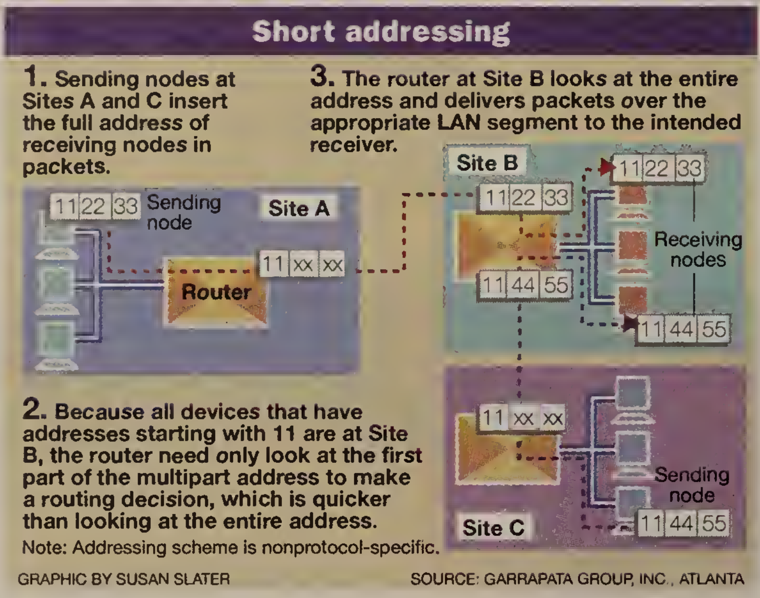
While collapsed backbones may become the rage of the future, a lot of users that need to interconnect LAN segments are sticking with the traditional approach.

St. Luke's Roosevelt Hospital Center in New York, for instance, uses Wellfleet routers to interconnect Ethernet and token-ring LAN segements in two hospital buildings that cover a 1 1/2-block area in Manhattan. Routers in nearby clinics and medical imaging centers are linked to the hospital. Most traffic is routed over 56K bit/sec circuits, but images are transmitted over full T-1s.

The network is used to support critical applications, such as ordering supplies and drugs to treat patients, as well as scheduling blood tests, X-rays, respiratory therapy and physical therapy. So far, the network has done exactly what it was designed to do, says Joe Azzara, the hospital's director of network services.

In addition to patient records, accounting and other files you'd expect to see zipping between network nodes, the hospital passes results of CAT scans, magnetic resonance images (MRI) and other radiology images around the network. This enables hospital staff to view images on workstations more quickly than waiting for film.

Short addressing


1. Sending nodes at Sites A and C insert the full address of receiving nodes in packets.
3. The router at Site B looks at the entire address and delivers packets over the appropriate LAN segment to the intended receiver.
Site B
11 22 33
11 22 33
Receiving nodes
11 44 55
11 44 55
11 22 33
Sending node
Site A
11 xx xx
Router
2. Because all devices that have addresses starting with 11 are at Site B, the router need only look at the first part of the multipart address to make a routing decision, which is quicker than looking at the entire address.
11 xx xx
Sending node
Site C
11 44 55

Note: Addressing scheme is nonprotocol-specific.

GRAPHIC BY SUSAN SLATER

SOURCE: GARRAPATA GROUP, INC., ATLANTA

For example, a doctor can place an order over the network for an MRI to be performed at a nearby imaging center. The center uses the network to coordinate patient billing information with the hospital. When the MRI is completed, results are shipped over the network to the doctor's workstation.

The network also serves off-campus clinics that provide follow-up and outpatient medical services to the community at more convenient locations. Router links to the clinics carry patient records, accounting information, orders for services and medical images.

Azzara says the network natively routes TCP/IP and Network Basic I/O System traffic. Digital Equipment Corp.'s Local Area Transport and Open Systems Interconnection protocols are bridged across the net.

SNA traffic continues to be carried on a separate network, but the hospital is considering moving it to the multiprotocol backbone. One option under consideration is to convert SNA's Synchronous Data Link Control to 802.2 Logical Link Control 2 (LLC2) packets and pass them to a router that supports IBM's Data Link Switching (DLSw). That router will then encapsulate LLC2 into a TCP/IP packet that can be routed across the network using DLSw.

That strategy keeps in line the hospital's long-term strategy to rely on TCP/IP as its standard network protocol.

For Azzara, support of the multiprotocol network has not been a large problem. Once devices are up and running, protocol issues seldom raise problems, and the Wellfleet routers have proven to be very reliable. Most of the impact he finds is bringing different equipment vendors in the imaging area together to work as units of an overall system. Once the compatibility issues are overcome, the network functions reliably.

The multiprotocol backbone was installed to meet the needs of LAN-based applications that generate large bursts of traffic that traditional circuit-switched network alternatives could not handle.

However, while routers handle large bursts of data, they can become congested and drag down network throughput. They also lack capacity management tools that inform users when upgrades are necessary and impose addressing requirements that may differ from existing conventions.

THE REGIONAL ROUTE

These issues become more complex when the network stretches out over greater distances. Peoples Natural Gas Co. of Pittsburgh, an operating company of Consolidated Natural Gas (CNG) of New Orleans, switched from a circuit-switched multiplexer network to a router-based multiprotocol backbone when it began implementing LAN-based applications for such tasks as administration and monitoring gas pipelines. Peoples has 12 CrossComm routers spread across western Pennsylvania that communicate over fractional T-1 facilities.

Bill Conner, director of communication technology at Peoples, says the need for LAN-based applications is a response to deregulation in the gas industry. Internal costs can no longer be marked up automatically and passed along in the company's rates since the prices are now market-driven. So the company is turning to PCs and LANs to trim data processing expenses.

While the business side of the gas industry is being deregulated, the operation of gas pipelines is still governed by ever more strict regulations that ensure safety. In fact, regulations now require the company to report such pipeline operation conditions as the quantity of gas available in storage, pipeline pressures and gas flow rates more frequently.

The high cost of supporting separate internetworks, in conjunction with an average 30% to 40% growth in traffic, is driving users to collapse multiple internets into a single backbone anchored by sophisticated routers, according to Ron Brown, a consultant in Boston.

Across the system, this has led to an explosion of data traffic and is requiring the development of new software that is moving the company in the direction of client/server processing.

According to Conner, Peoples' network currently routes native TCP/IP, IPX, Xerox Corp. Xerox Network Systems and NETBIOS. SNA traffic, which is largely confined to the Pittsburgh headquarters, is not carried over the backbone routers.

Peoples also has a link into CNG's nationwide backbone of 33 CrossComm routers that carry traffic from New Orleans to Chicago and down the Eastern Seaboard at fractional T-1 speeds. The same protocol suite is routed over the CNG network, but backbone traffic consists only of information flowing between the operating units and headquarters.

One of the early issues faced by Peoples was congestion. Congestion in a router environment occurs when the router tried to transmit more data than its processor will allow or its circuits can handle.

When that happens, the router prioritizes its work according to a preset user table of instructions, which means some work doesn't get done and data can be lost. Packet networks assume that any data lost by the network will be identified by higher level transmission protocols used by the sending and receiving devices, which then coordinate retransmission of the missing data. The process generally works, but causes added delays in end-to-end transmission.

Conner says there are several congestion issues still facing the router industry. Chief among them is the need to simplify router operating software.

The amount of operating software that tells the router what to do when it gets congested is complex and grows quickly as protocols are added to the router. The increased amount of code slows the operation of the router and when that load is combined with added traffic, the router's work is multiplied.

In some cases, the addition of a protocol on a network may require the router to be outfitted with a faster processor, more random-access memory, faster wide-area interfaces and more circuit bandwidth.

A good way to handle congestion, Conner says, is to implement some form of prioritization that enables some types of traffic to be transmitted before others when the router is overloaded. Prioritization enables a network node to deny service according to a user-defined schedule when network overload occurs, rather than letting users be randomly affected by data loss.

However, prioritization is available in most systems only at the protocol level, meaning that users would have to assign all TCP/IP traffic greater priority than IPX, for instance. This does little good when one or two IPX-based applications are critical and should have priority over one or two less important TCP/IP applications. Therefore, there is no way to differentiate between a message transmitted by the president of the company and one sent by the parking garage attendant.

Conner says another way to control congestion is to minimize event storms that broadcast messages throughout the network when a specific event, such as a node failure, occurs. CNG's network was struck with event storms when valid messages were propagated into unnecessary areas of the network where they wasted router capacity.

Left alone, event storms can bring the network to its knees. For instance, a network node that crashes because of a traffic overload causes all other nodes to exchange messages to discontinue every session with the failed node. The added message traffic can overload other nodes, which also shut down and cause more messages. The whole network can be driven out of service when this happens, and technicians can spend hours restarting it. A software change to permanently limit the number of event messages can solve this problem.

The same thing can happen with routers generating too many Simple Network Management Protocol traps or alarms. An overzealous network manager who requests too much SNMP data from routers too often can also cause problems.

Overhead messages in SNMP systems can generate as much as 50% of the traffic on some networks in such cases.

A manager at an East Coast equipment manufacturer found this out the hard way when he requested traffic data from every router port every 30 seconds. The SNMP traffic shut the firm's internal network down until the request was changed.

WIDE-AREA WORRIES

Congestion is an even larger issue when the network spreads over wider areas. One way the National Aeronautics and Space Administration deals with congestion is to retain tight controls on addresses. As NASA's Program Support Communications Network Internet (PSCNI) shows, controlling addresses on a multiprotocol network is a significant task.

According to Jim Wrap, engineering manager for PSCNI, the net supports five protocol suites: Apple Computer, Inc.'s AppleTalk, DEC's DECnet, IPX, TCP/IP and XNS. Support for Government OSI Profile is in the planning stage.

Wrap says NASA must assure that every vendor and NASA office linked into the PSCNI is coordinated into an addressing scheme for each protocol they use.

For TCP/IP, that is not a problem because most of the users already are on the Internet and that system eliminates duplicate addresses. NASA helps provide Internet access to any new contractor that is not yet on Internet and requires access to the PSCNI.

For XNS, NASA obtained a block of address numbers from Xerox, which issues all XNS addresses. Those numbers were then assigned to both users within NASA and NASA contractors under a mandatory plan that each user group had to adopt in order to gain access to the PSCNI.

There is no overall address control agency for AppleTalk, so NASA developed its own plan to control address assignments agencywide and across the contractor community. Any entity requiring connectivity for native AppleTalk across the PSCNI is forced to change its internal AppleTalk addressing to comply with NASA's plan.

Such a uniform addressing scheme prevents two users or network devices from sharing the same address, which simply cannot be allowed. It also enables users to assign blocks of addresses to certain locations, making simplified routing tables. If addresses are assigned in blocks, routers need only look at a portion of a destination address to know that the receiver is at a different site. This also makes routing a bit faster (see graphic, page 36).

NASA chose the PSCNI when communications among internal project staff as well as service and equipment vendors began to increase rapidly on a number of projects, including the space shuttle and space station. The network of Cisco routers was installed by Boeing Computer Systems, acting as a systems integrator. The net now links NASA's 17 locations in the U.S., as well as locations in Canada, Europe and Japan.

PSCNI was intended to give NASA routed connectivity for LAN traffic across a number of diverse departments and vendors. "With requirements for switched routing of users and LAN traffic, the router solution was the only technical alternative that made sense," Wrap says.

However there were drawbacks with its coverage of older protocols such as SNA. "Point-to-point protocols, like Binary Synchronous Communications and SNA SDLC, just aren't handled well in a routed environment," he says.

Although developments are occurring very quickly in handling SNA traffic over a multiprotocol router network, Wrap does not yet feel comfortable enough with the stability of the SNA options available on NASA's Cisco routers to move SNA traffic onto the PSCNI. SNA connectivity is provided by a T-1/T-3 multiplexer network that also supports PSCNI traffic. The Cisco routers are connected to ports on a T-1/T-3 mux.

Other users have confidence in existing methods for handling SNA over a multiprotocol backbone. Telecom Australia, for instance, utilizes routers that can act like IBM front-end processors (FEP) to establish channel-to-channel links between remote IBM hosts.

Australia's telephone carrier is installing routers to improve internal operations and drive down data processing costs. The move comes after the government paved the way for competition in telephone services.

Doug Crocket, general manager at Telecom Australia, and his staff are overseeing installation of the Australiawide multiprotocol backbone, called the Corporate Data Network-Backbone (CDN-B). CDN-B currently comprises more than 200 Network Systems Corp. Series 6000 routers connected by Fiber Distributed Data Interface links.

Crocket has limited routed protocols to TCP/IP and IPX in order to control the complexity of the routing environment in this very large network.

SNA is carried through a direct router to IBM host-based byte channel attachment. The routers emulate IBM 3725 FEPs supporting token-ring users.

As well as supporting IBM hosts, CDN-B supports connectivity to Bull Worldwide Information Systems computers, as well as links among more than 1,000 Hewlett-Packard Co. HP-9000 and other Unix-based processors, 25,000 PCs, 500 Unix workstations, 1,200 Novell servers and 15,000 host-based terminals at an estimated savings of more than $50 million Australian dollars a year.

The strategic thinking for installing the network was to eliminate several overlayed single-use networks that did not serve the routing needs of the firm's growing LAN traffic. The company was also able to save a large amount of money by eliminating a number of IBM FEPs.

Equitable Real Estate Investment Management, Inc. takes a different approach to supporting SNA traffic. The firm encapsulates SNA in IPX packets, which are then routed across the network.

Equitable Real Estate is one of the largest single holders of commercial real estate in the country, with offices coast to coast. One of the firm's subsidiaries is a major property management and services vendor to the Resolution Trust Co., which is selling off assests of failed banks. The company must have the flexibility to move offices as necessary and still support them with reliable service. Additionally, since it is a very competitive business, it must deliver communications at a low cost.

Ed Neustadt, a senior networking engineer with Equitable Real Estate, together with Rod Allen, a sales consultant and engineer at Safenet, Inc., a major regional systems integrator for Novell and related LAN and routing equipment in Atlanta, designed and installed a nationwide network of 85 Wellfleet routers. The architecture supports an IBM 3090-based data center and distributed IBM Application System/400s, IBM RISC System/6000s and more than 85 Novell file servers over fractional T-1 links.

But supporting SNA traffic as IPX on the network was not the big issue for Neustadt. He says the lack of reliable network modeling tools for multiprotocol router networks makes it difficult to manage router network capacity and congestion. In fact, he says most users handle congestion and management woes by simply installing routers with more processing power and memory than is required and transmission facilities that offer more than enough speed.

With the bursty nature of LAN traffic, oversizing the network processors makes sense initially. Growth, however, can quickly overload the routers. Users don't yet have adequate tools to monitor capacity requirements in multiprotocol router networks in order to keep the design ahead of growth. Overprovisioning and response time monitoring seem to be the industry-accepted defenses against the problem right now.

Most networks use fractional T-1s or full T-1s to interconnect routers. These circuits can carry the peaks of bursty traffic with capacity to spare. This can usually be done at less cost than the existing line expenses of the multiple independent networks that were replaced by the multiprotocol backbone.

SUPPORT ISSUES

Whatever the scope of your multiprotocol router network, it is clear that there are two additional issues that will affect its success: the service given by the vendor and the vendor's commitment to develop state-of-the-art functions that will meet your current and future requirements. The choice of a vendor is a long-term commitment. To warrant user trust, the vendor should demonstrate top-of-the-line support and equipment now and the ability to sustain that position in the future.

Service is a major factor in network availability, a basic requirement of any company. All networks have problems, both hardware and software. When problems do crop up, quick service response affects the outage's impact on network availability.

The best service is a combination of assets. It requires getting a technician to a user's site within a reasonable amount of time and access to spare parts quickly. When service is provided by a third party, it also requires immediate help from the manufacturer when a difficult problem has an unacceptable impact on a mission-critical function.

The first two service requirements are basic to most companies, but the third is really tough to provide. While it's difficult to develop real customer service, however, it stands out when you see it.

Continued on page 38

The next-generation WAN processor will combine voice, routing and support for legacy protocols in a single unit. However, users probably won't buy one unless the price is in line with the current $2,000- to $3,000-per-port cost of routers, according to Strategic Networks Consulting, Inc. in Rockland, Mass.

Fitting the old and new

There are several options for integrating IBM Systems Network Architecture into a multiprotocol backbone router net, says Tom D'Auria, a member of the INTEROP program committee and principal of SMA Management Systems, Inc. in White Plains, N.Y.

However, not all leading router vendors offer these options. Support for old wide-area protocols, especially SNA, is a complex issue for the routing community. It was not given the highest priority by router developers and is still evolving today, long after support for local-area network protocols was largely finalized in their offerings.

Yet SNA-based applications still exist and will continue to exist for some time, even as a large number of users aggressively move toward LAN environments. This change in the role of the IBM host and its SNA network makes a temporary but clumsy solution for SNA on routers acceptable. Enabling routers to support SNA will provide savings in the short term by eliminating the parallel SNA network, but the need to support SNA on routers will itself be eliminated as the host goes out the door.

For some users, though, the dedication to SNA is longer term. Even these users find that their selected router vendor has not yet released an elegant SNA solution. So they, too, are forced to piece together a temporary solution.

And there are a number of temporary solutions available today, including such simple approaches as direct SNA pass-through. These approaches will be refined by both IBM and the router community.

Following is a sampling of current solutions:

■ **SNA pass-through.** In this solution, logical channels between SNA devices are set up over the router network, similar to permanent virtual circuits in the X.25 world. This enables SNA traffic to be carried over the router network but not as a "routed" protocol.

■ **SNA conversion.** In this case, SNA is converted to another routable protocol by an external protocol converter, and the converted traffic is handled by the routers. This method usually involves spoofing an IBM 3745 front-end processor (FEP) and terminal controller to keep timers from terminating the session due to the unpredictable delay of the router network. Spoofing makes the FEP and terminal controller believe they have received responses when they actually have not.

■ **SNA encapsulation.** In this solution, SNA traffic is encapsulated in packets of a routable protocol. There is significant overhead with this solution because one complete protocol runs inside of another. But any increase in transport capacity costs may be offset by savings from eliminating the separate SNA network. Spoofing to cover network latency is necessary to avoid session time-outs here, too.

Many solutions require a combination of techniques. An SNA Synchronous Data Link Control packet may be converted to Logical Link Control 2 and transmitted via a router supporting IBM's Data Link Switching (DLSw) protocol. DLSw can then be encapsulated into the Transmission Control Protocol/Internet Protocol and routed as TCP/IP over the router network.

There are a number of such possible solutions, but they are more complex and require a significant amount of customizing to fit the individual situation within the company.

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Continued from page 37

Ernie Labbe, vice president of service at CrossComm and a former senior director of service at Motorola Codex, has developed a state-of-the-art system using an unusually high level of personnel plus special service features built into the hardware.

When a customer calls, service personnel can dial into any node on the network and look at all of the operating parameters as well as the software. They can also logically transfer to other routers in the network and look at any parameter on any of them. They can access the customer's SNMP system but are not limited by that management system's troubleshooting abilities.

This dial-in diagnosis is not unique. Most vendors have a technical assistance center, where technicians receive customer calls and dial into faulty routers to diagnose problems and correct software code.

What is unusual about CrossComm's approach is its service-team concept in which experts in all supported protocols work in a so-called war room that has multiple large displays for situations requiring more than one specialist. A special feature in its router software enables CrossComm technicians to trap messages passing through the routers to see exactly what problems are being introduced and where in the network they are coming from.

In virtually all network problems, the team member versed in the protocol causing the problem can diagnose the trouble and fix the software or identify the bad board directly from the factory, within minutes of a customer's call.

Equally important is the concept of enabling the customer to control the escalation of problem resolution.

Rather than relying on the usual time-driven escalation table that requires a problem to reach a certain time limit before it is raised to the next level of management, any CrossComm customer can declare an emergency at any time. When the customer declares an emergency, the full resources of the company, from technical staff to the president, are available to resolve the problem.

This type of service can go a long way toward making multiprotocol backbones appear as if they are the pot of gold at the end of the rainbow. But, as everyone knows, just when you think you've got the pot dug up, the rainbow changes course.

And so it goes. Carriers and equipment vendors are now talking about or delivering early versions of Asynchronous Transfer Mode technology, which promises to carry any type of traffic at any just about any speed.

Stay tuned for more.

➾ Pruitt is a principal with Garrapata Group, Inc., a consulting firm near Atlanta and can be reached at (404) 516-5770 or via MCI Mail at 609-8472.

Help desk

Continued from page 2

management systems, a combination of front-end client and middleware products could be used to tie together information from the diverse databases.

In this approach, the front-end software runs on an intelligent desktop computer, such as a personal computer or Macintosh, and provides the interface for the doctors to query for information. Front-end products you might want to consider include query tools such as Gupta Corp.'s Quest; Executive Information System software such as Channel Computing, Inc.'s Forest & Trees; and front-end client/server tools such as Powersoft Corp.'s PowerBuilder.

The middleware product provides the glue between the front-end software and the database. It translates the queries originating from the front-end tool to the native database commands, returning the information requested to the client computer.

Examples of middleware products you might consider include Digital Equipment Corp.'s Accessworks and Information Builders, Inc.'s Enterprise Data Access/SQL.

I want to connect a remote Apple Computer, Inc. Macintosh IIci and a remote Mac IIx to a Sun Microsystems, Inc. Ethernet network. I want to specifically know about Macintosh-based [Network File System] software and X window system emulation packages. Remote users currently dial into the net using Synergy Software's VersaTerm-Pro communications software.

Mark French, Trenton, N.J.

Joel Snyder, senior partner with Opus One, a Tucson, Ariz., consultancy specializing in networks and information technology, replies:

The easiest way to integrate a few Macintoshes into a larger Sun network is to use NFS. Two NFS packages for the Macintosh you may want to consider are InterCon Systems Corp.'s NFS/Share client and The Wollongong Group, Inc.'s Pathway Access NFS client. Both packages mount NFS volumes from a variety of hosts, allow read/write access to the volumes, support the standard PC NFS authentication methods and have no obvious compatibility problems with the newest version of VersaTerm-Pro. Both packages have a list price of $295.

A recent benchmark of Pathway against NFS/Share showed NFS/Share to be a faster performer in most file operations, such as file opens and data transfer. InterCon offers free demonstration copies of NFS/Share. You can reach InterCon at (703) 709-5610 and Wollongong at (415) 962-7100.

Two candidates for a Macintosh X server, which does X Window system emulation, are Apple's MacX and White Pine Software, Inc.'s eXodus. Both packages cost $295 and provide X service to various clients over Transmission Control Protocol/Internet Protocol and DECnet. We recently ran an industry standard X Window system benchmark known as Xstone on both products on a Quadra 700 and found that MacX is about 50% faster than eXodus. That's about four times faster than the standard X Window software running on a Sun Microsystems, Inc.'s 3/50.

However, an interesting alternative presented itself when we reran the benchmarks under A/UX, Apple's Unix operating system. Under A/UX, performance of MacX shot up another 25%. But even more impressive, the native X server under A/UX came in six times faster than the standard X Window software running on a Sun 3/50.

Since you're interested in both NFS and X Window system emulation, your best bet may be to buy A/UX. A/UX includes NFS client software and an X server and will allow you to continue to use the standard Macintosh applications such as VersaTerm-Pro, Microsoft Corp. Excel and Microsoft Word. At $800, A/UX costs more than an NFS client and X server alone. A/UX also takes up more disk space. But you might find the performance and additional features that Unix on the Macintosh gives outweigh these drawbacks. Z

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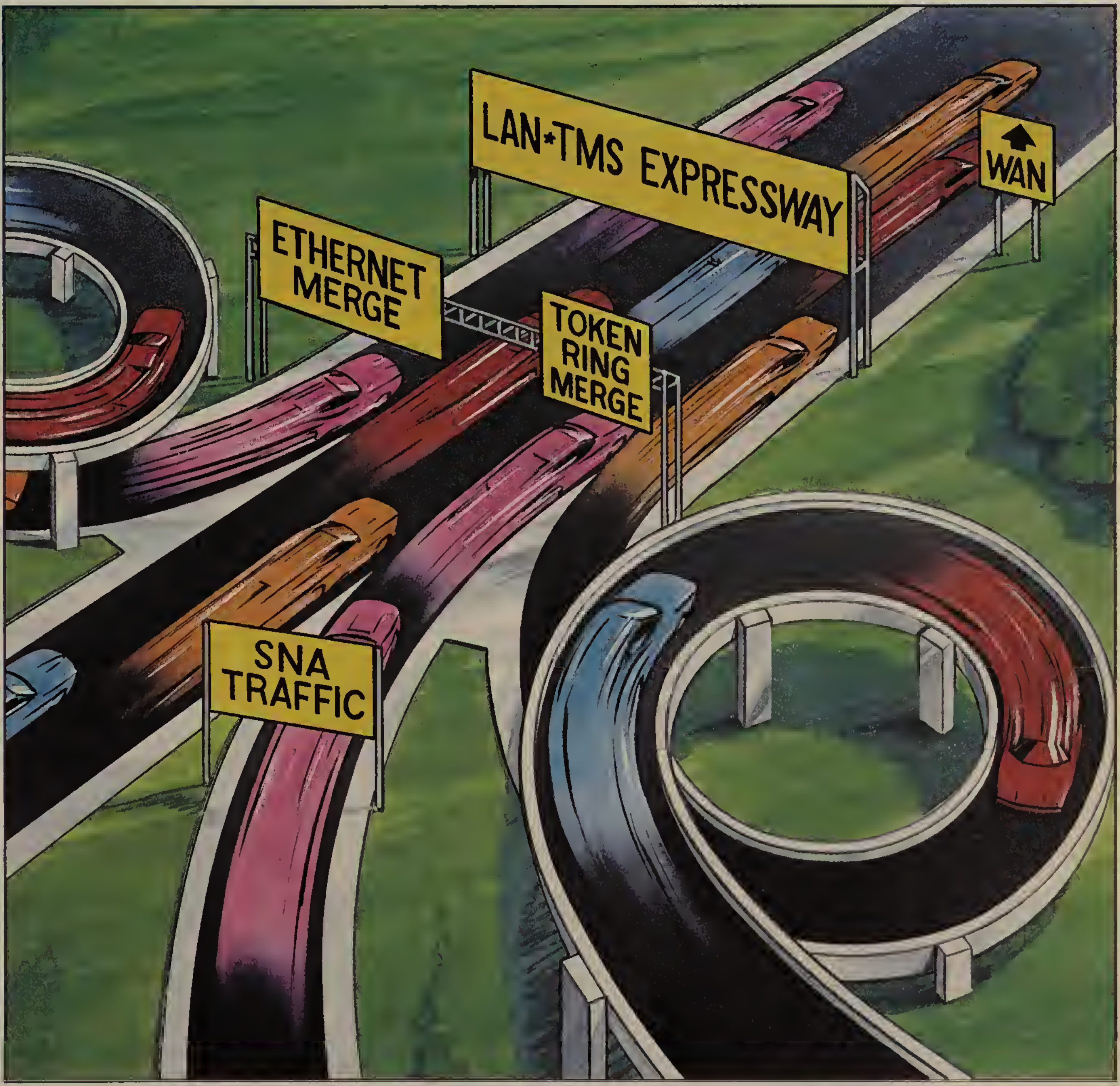

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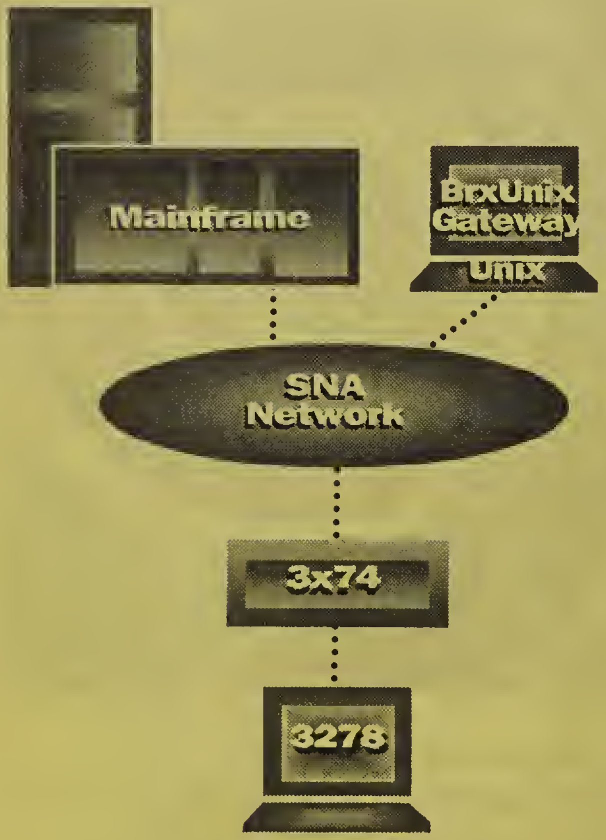

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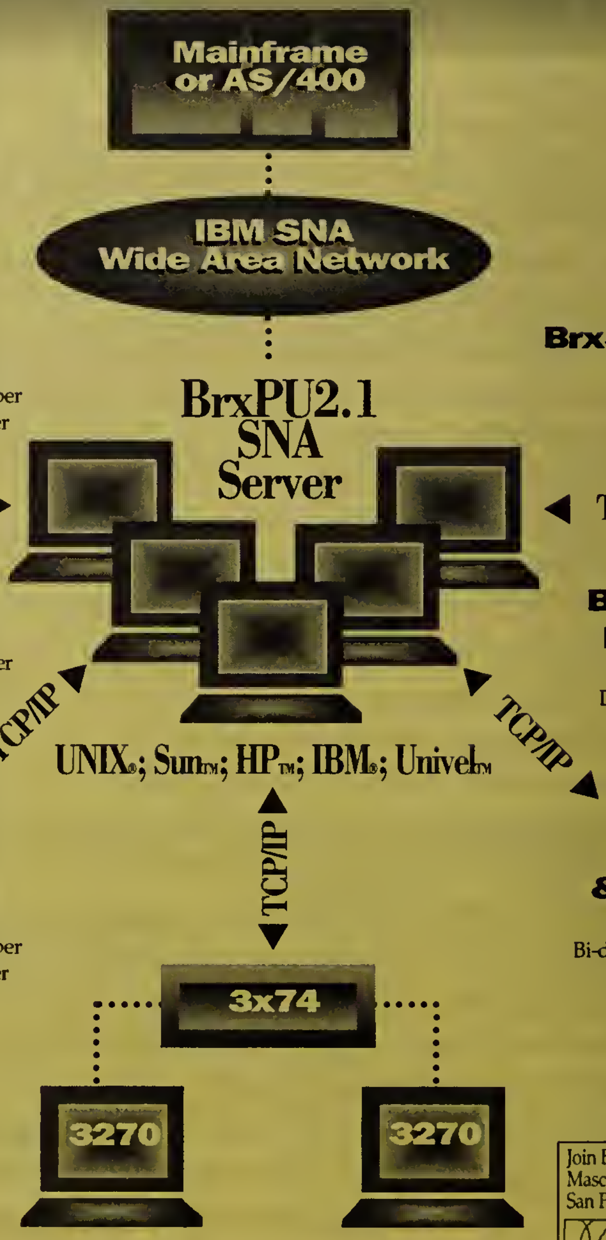

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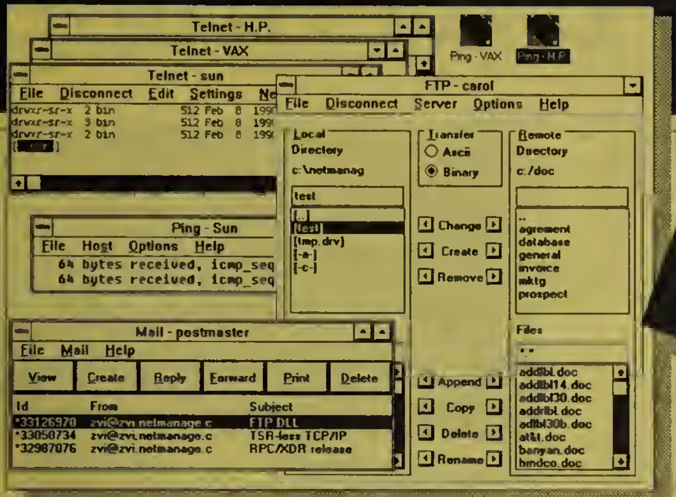
TCP/IP for Windows



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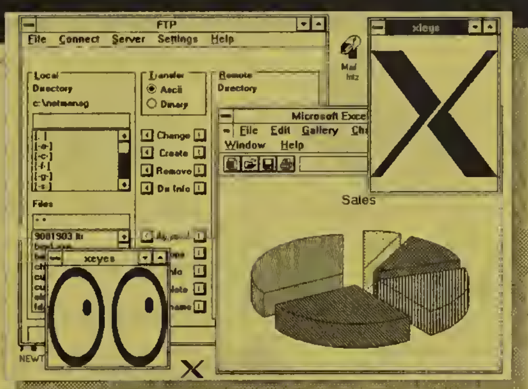

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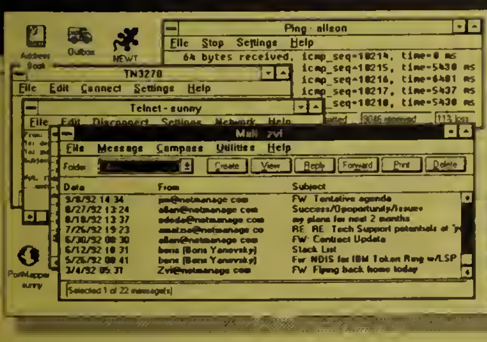

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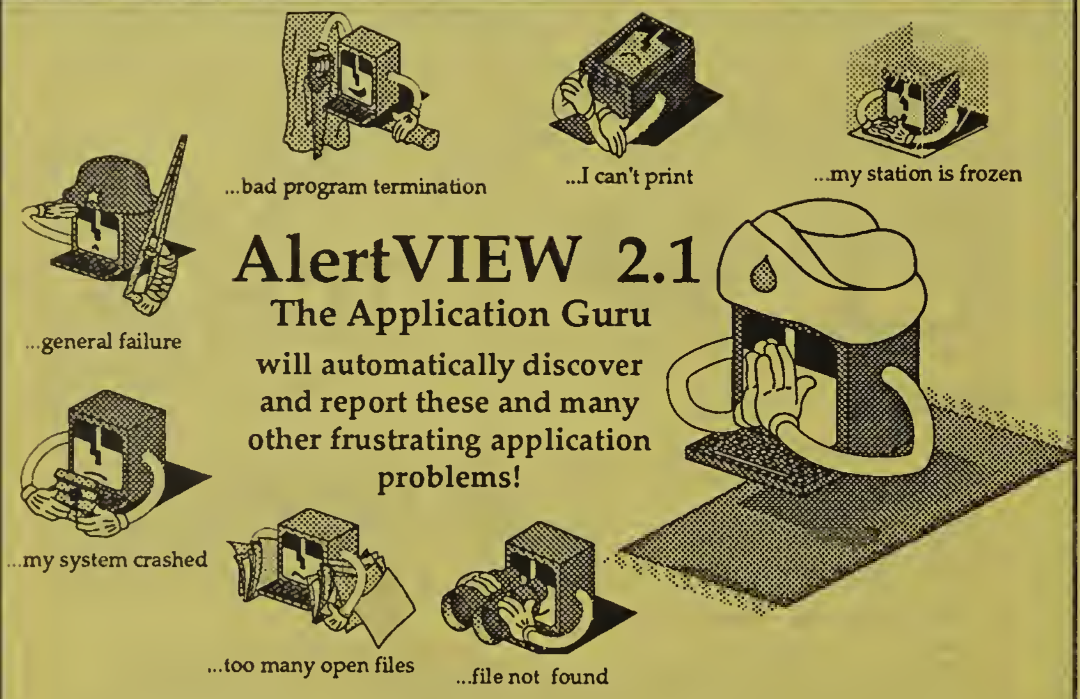

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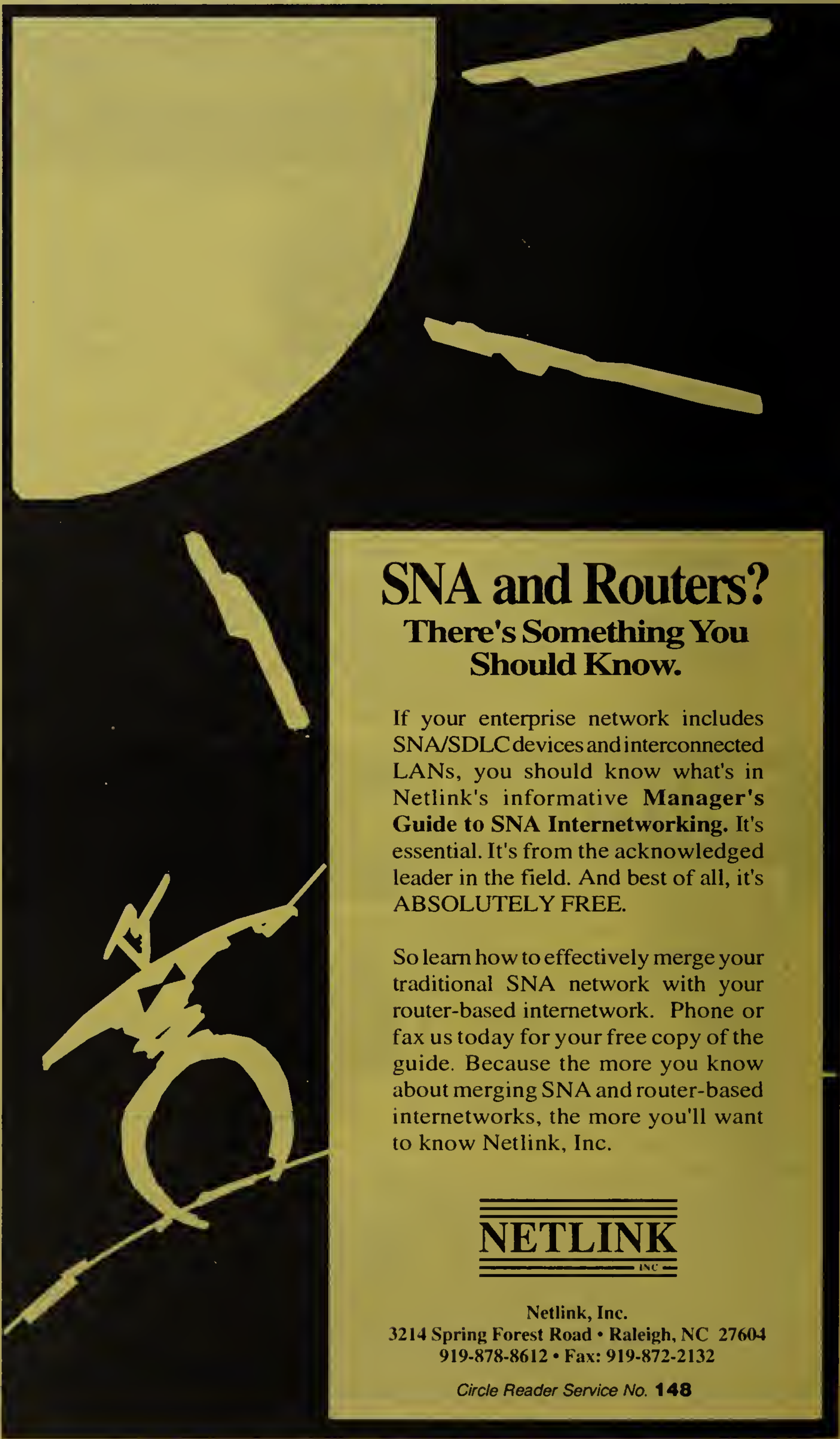

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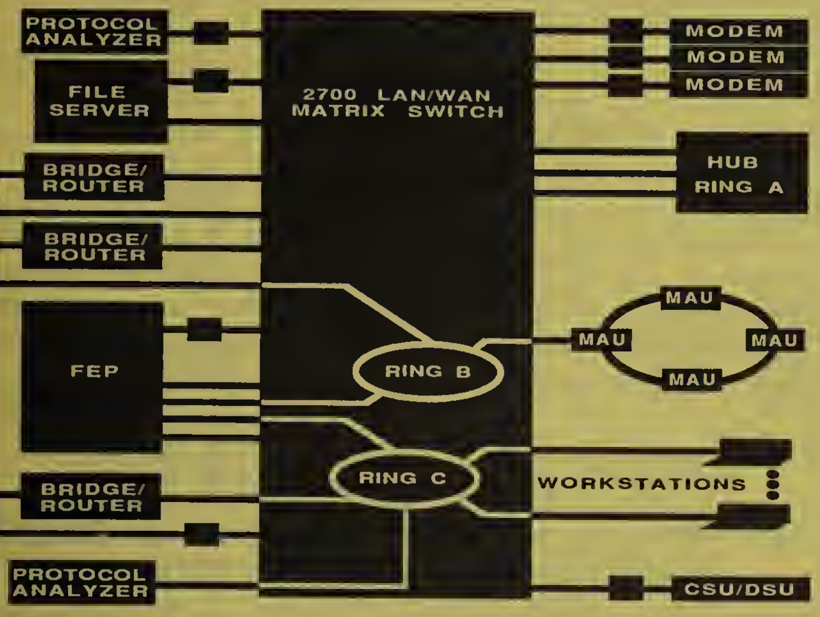

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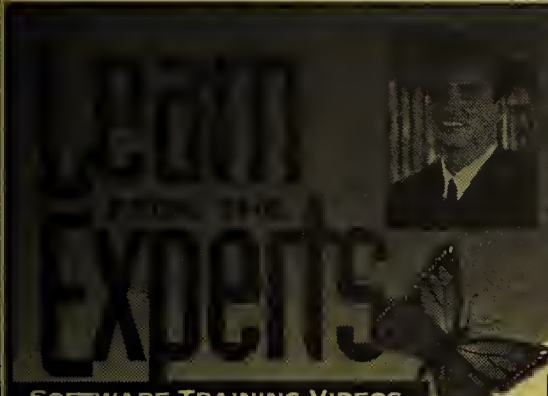

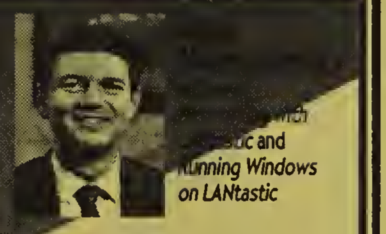

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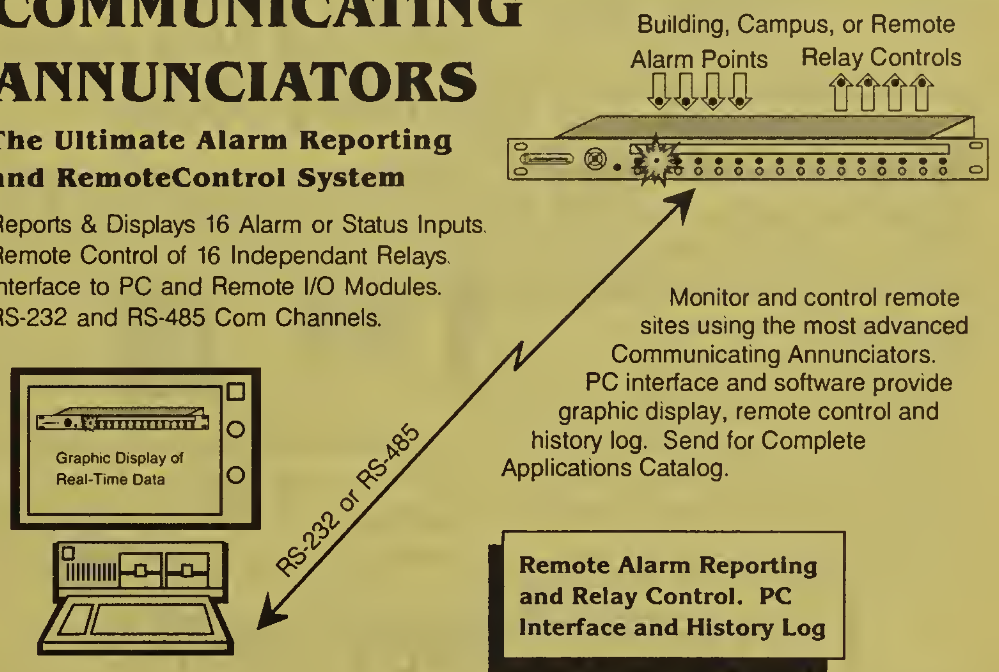

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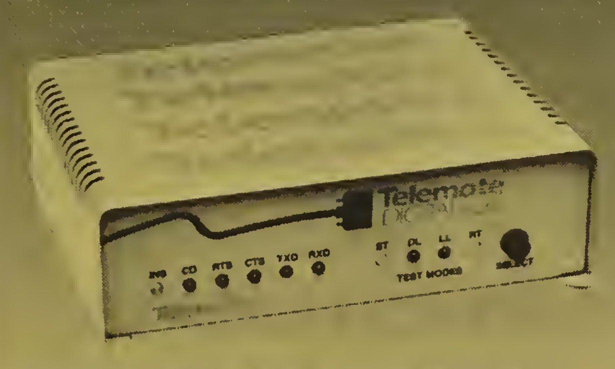

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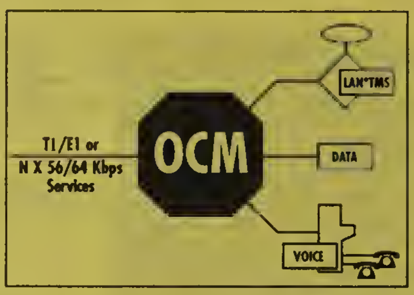

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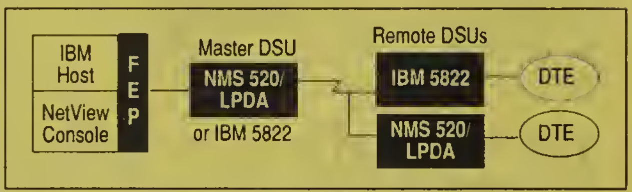

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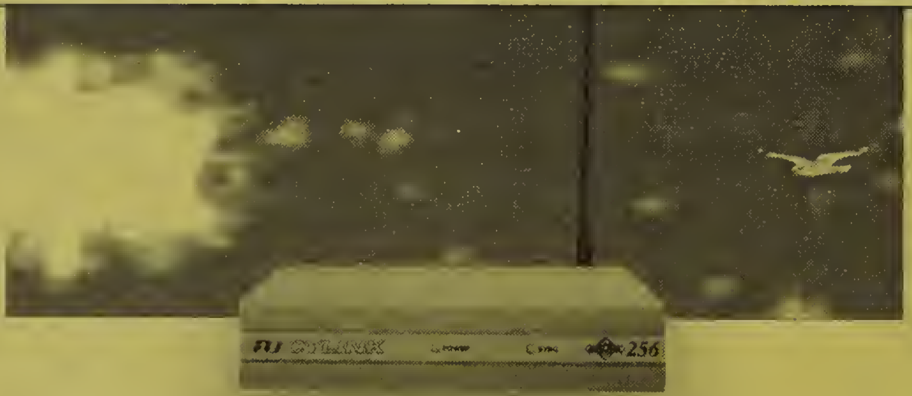

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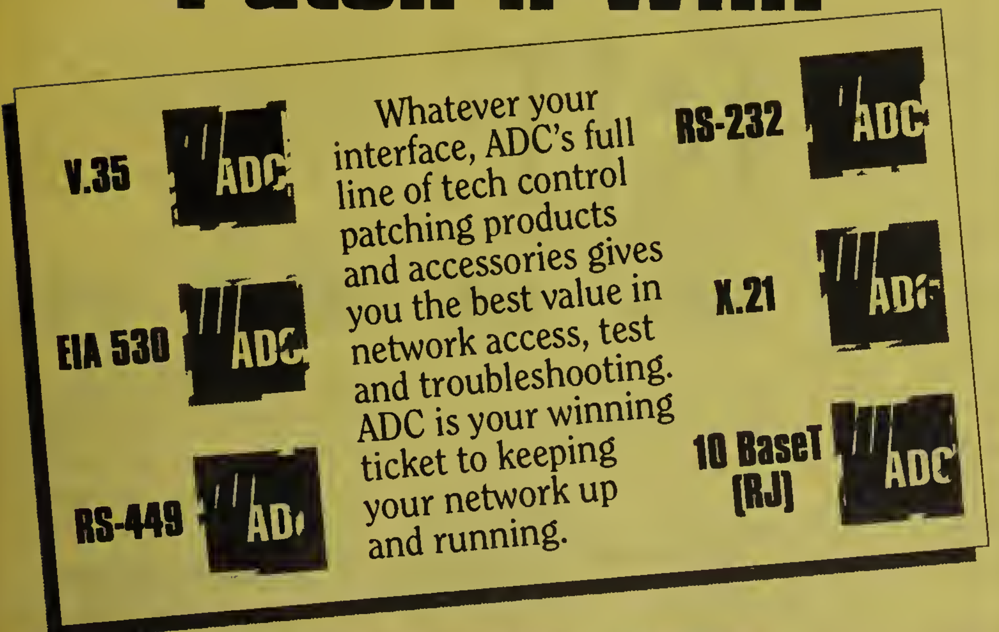

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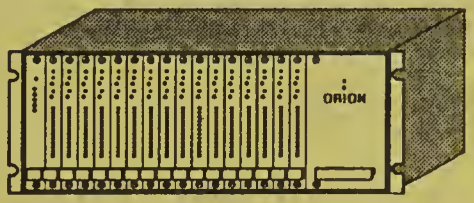

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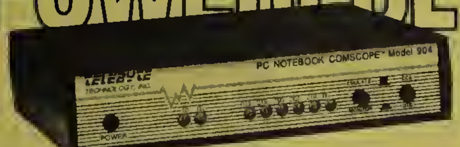

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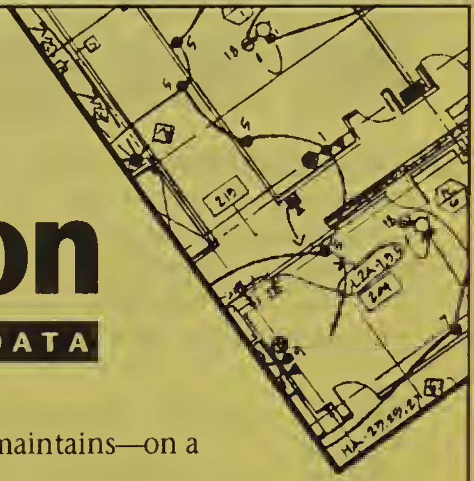

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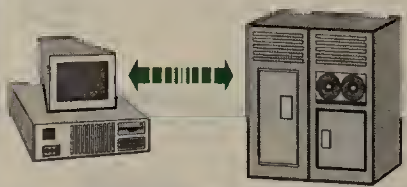

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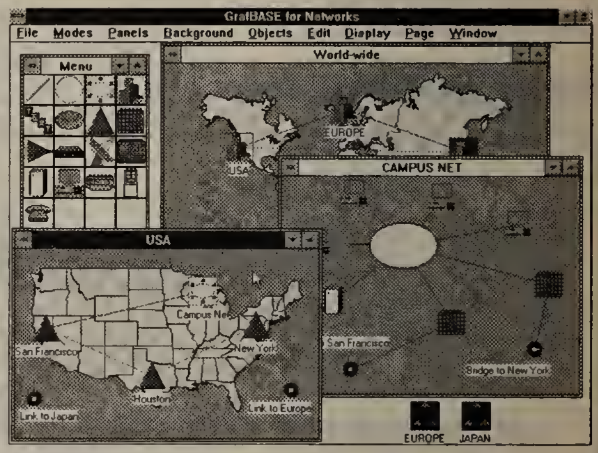

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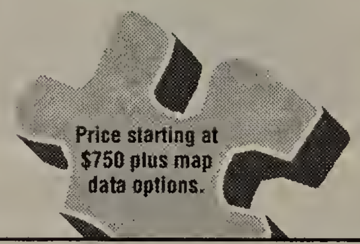

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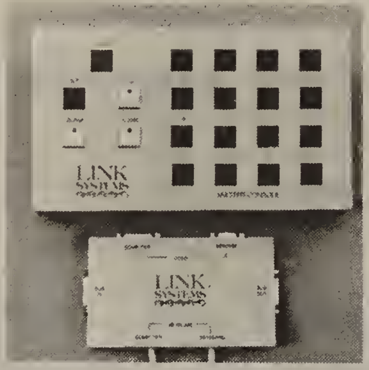

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Bytex

Continued from page 6

Exchange (IPX/SPX), Transmission Control Protocol/Internet Protocol and several IBM protocols.

Besides PIR, the modules support the Routing Information Protocol, with support for Open Shortest Path First and Advanced Peer-to-Peer Networking Network Node to follow. They also support the transparent, source route and source routing transparent bridging algorithms. Wide-area net services supported include T-1, fractional T-1 and frame relay at speeds from 9.6K to 1.544M bit/sec. The modules will be available in the fourth quarter and priced between $10,000 and $16,000, depending on configuration.

Bytex's new Card Switched Ethernet (CSE) module supports 12 10Base-T Ethernet ports. It is software-switchable between the three internal Ethernet backplanes, or it can be isolated as its own independent Ethernet.

Available in the fourth quarter, the model with the AUI port costs $1,595, while the card with 10Base-FL is $1,895.

Bytex is also offering a Port Switched Ethernet (PSE) module, which takes the CSE approach a step further, letting the net manager switch users among an unlimited number of Ethernets on a port-level basis. When used in conjunction with the company's new Virtual Multiport Repeater hardware/software architecture and the 7700's matrix switching fabric, PSE will allow net managers to define an unlimited number of virtual Ethernets in a single 7700 and across several hubs.

Available in the first quarter of next year, PSE pricing will range from $1,700 to $2,700, depending on media type.

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Novell

Continued from page 8

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"If a NetWare for SAA alert is sent to the NMS console, the administrator can identify the server, find out what caused the alert and change the configuration of the server — all remotely from the NMS console," said Bernard Harguindeguy, marketing manager at Novell's Interoperability Systems Group here.

NetWare for SAA Services Manager 2.0 replaces Novell's Communications Services Manager (CSM) product, which the company previously offered to help manage its NetWare for SAA NetWare-to-IBM host links. CSM did not offer mapping capabilities and was not integrated with NMS. So it could not provide an enterprise view of NetWare for SAA servers.

"CSM was a workstation-based monitoring tool — it wasn't incorporated at all into NMS," said Clem Bowen, systems analyst at Buck Consultants, a New York-based NMS user that has beta-tested the new application. "With NetWare for SAA Services Manager integrated with NMS, we'll be able to easily troubleshoot and manage our NetWare-to-IBM host connections, along with other net components, such as hubs and routers, from a central console."

NetWare for SAA Services Manager 2.0 is available now for $3,495. Customers that want to upgrade from CSM 1.1 to the new NMS-based software can do so free of charge by calling (800) 873-2831.

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Groupware

Continued from page 6

puting environments of today."

GUAVA will create a forum for groupware users to share experiences. With the adoption of products such as Lotus Development Corp's. Lotus Notes, users have embraced the concept of collaborative processing. Yet there are issues to be resolved, such as configuring networks to support these new applications.

Work flow, a subset of groupware, will soon have its own forum, as well. The Workflow Management Coalition will initially comprise about 20 companies, including at least one user organization that has not been announced. Coalition members include Action Technologies, Inc., AT&T/NCR Corp., CAP Gemini America, Inc., Groupe Bull, IBM, ICL, Lotus, Quality Decision Management and Staffware.

The group's charter is to develop specifications for interoperability between work flow management systems and applications, including those based on different platforms, such as messaging or databases. Work flow systems automate business processes.

Support for such specifications would enable one vendor's work flow system to kick off a procedure on another vendor's system or application, said Alan Rodgers, product manager of work flow at Lotus. "Initially, we'll be looking at very basic interoperability," Rodgers said. "But when you come to one work flow process starting another, you have to have an interchange format."

Work flow vendors realize that their products have to interoperate because no one system can cover all user needs.

©GUAVA: (415) 282-9151; Workflow Management Coalition: (415) 473-9990.

ROUTING SNA

DEC's SNA routing scheme includes DLSw, gateways

BY JIM DUFFY

Maynard, Mass.

Digital Equipment Corp. is putting the final touches on its strategy for integrating DECnet and IBM SNA traffic on LAN internetworks, a plan that sources say hinges on archrival IBM's Data Link Switching (DLSw) technology.

Sources familiar with DEC's Systems Network Architecture routing plans say the vendor will offer software upgrades for its DECNIS 500/600 backbone routers and DEC WANrouter 500 access routers that add DLSw support.

DLSw was developed by IBM for routing SNA and Network Basic I/O System traffic over Transmission Control Protocol/Internet Protocol backbones and was recently submitted to the Internet Engineering Task Force as a request for comment, a step along the way to standardizing the technology. That submission gives non-IBM vendors such as DEC free access to the specification.

GATEWAY POSITIONING

Besides DLSw, DEC's SNA routing strategy involves the vendor's DECnet/SNA gateways (*NW*, March 8, page 9). Analysts say DEC will position its DECnet/SNA Domain Gateway-CT, which attaches to an IBM mainframe channel, as a high-speed conduit that bypasses an IBM front-end processor and provides a link between SNA subareas, distributed local-area networks and DECnet environments.

The speed of the channel linking the gateway to the host is between 3M and 4M byte/sec (24M and 32M bit/sec, respectively), whereas routers usually attach to hosts through front-end processors via 4M or 16M bit/sec token-ring links or 1.54M bit/sec T-1 serial links.

DEC may also add TCP/IP support to the Domain Gateway-CT so the device can strip SNA data out of incoming TCP/IP packets before delivering them to IBM hosts, sources said.

The DLSw and channel-attached gateway combination could be attractive to users with DECnet and SNA networks.

Roughly 21% of the largest U.S. companies use both DECnet and IBM's SNA/Synchronous Data Link Control protocols, according to a survey of 400 MIS managers conducted by Business Research Group of Newton, Mass.

The products would provide a fast, efficient way to integrate the environments and would offer major performance advantages over competing solutions, said one source who was briefed by DEC on its SNA routing scheme.

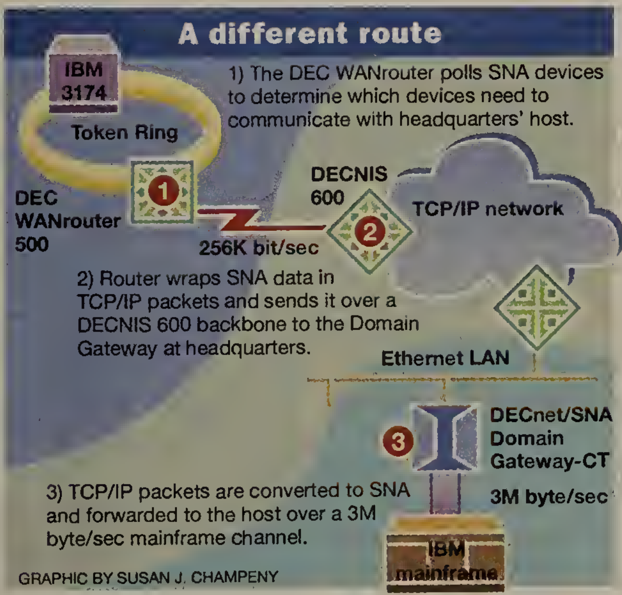
At press time, DEC had not yet commented on the plan, which sources say will be announced by the end of the year.

Besides DLSw, DEC's SNA routing strategy involves the vendor's DECnet/SNA gateways.

The company decided to adopt DLSw instead of IBM's Advanced Peer-to-Peer Networking or Cisco Systems, Inc.'s Advanced Peer-to-Peer Internetworking because the vendor believes DLSw has a better chance of becoming a standard, sources said. Other routing vendors, such as Cisco, Proteon, Inc. and Wellfleet Communications Corp., have also endorsed DLSw.

In practice, the use of a DLSw-equipped router and TCP/IP-enabled gateway would let a DEC WANrouter 500 at a regional office poll an SNA cluster controller on a token-ring LAN and encapsulate data for transmission across a TCP/IP backbone comprising DECNIS 500 or 600 routers.

Traffic arriving at a Domain Gateway-CT in headquarters would be translated back into SNA and sent directly into the host over a channel attachment (see graphic, this page).



1) The DEC WANrouter polls SNA devices to determine which devices need to communicate with headquarters' host.

2) Router wraps SNA data in TCP/IP packets and sends it over a DECNIS 600 backbone to the Domain Gateway at headquarters.

3) TCP/IP packets are converted to SNA and forwarded to the host over a 3M byte/sec mainframe channel.

GRAPHIC BY SUSAN J. CHAMPENY

DEC is opting to use its Domain Gateway-CT as a key component of its SNA routing scheme instead of developing a channel attachment for its DECNIS router because it does not want to cannibalize sales of its DECnet/SNA gateways, sources said.

DEC also believes it can get its new router and gateway software to market more quickly than new hardware because the company's recent cost cutting has curtailed development of networking hardware, sources said.

Pricing and availability of the new software could not be learned by press time.

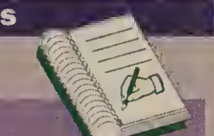
Challenges

Continued from page 1

some troublesome security issues, as well.

Priced less than $1,000 and equipped with an easy-to-use pen-based interface, MessagePad, and similar devices from AT&T, Casio Computer Co., Motorola, Inc., Sharp Corp., Tandy Corp. and others, may appeal to users intimidated by laptop or notebook computers or hesitant to pay for the privilege of hefting a notebook just to access electronic mail or data on an occasional basis.

Newton facts



The initial MessagePad rollout will include 3 models:

- A base model with no modem and a street price of about $700.
- A mid-range model with an external 2,400 bit/sec modem that can send faxes and is priced around $800.
- A top-of-the-line model, which costs about $900, that has a modem and Newton Connection Pro — software and cabling that links MessagePad to Macintosh or Windows desktop and notebook computers.

Additional models are expected to be released by the end of the year.

GRAPHIC BY TERRI MITCHELL

"Executives will be the end users [of hand-held personal communicators], and they will want to get at their E-mail and host data," said Ronald Brown, president and chief executive officer of Notable Technologies, Inc., which makes communications software for the somewhat similar EO device. "Network administrators will have the pleasure of making it easy to get at this stuff."

"It's an entirely new ball game for network managers," agreed Stan Schatt, director of LAN services for InfoCorp in Santa Clara, Calif. "There's going to be more of a clamor for remote access when Newton hits the streets."

In addition to remote access via modem, Schatt said, users will want to connect from various places within a building and create ad hoc networks for meetings. Those mostly wireless nets will have to be linked to existing wired networks for access to corporate data and other resources.

That means network managers "will see more demand for wireless communications bridged to existing local-area networks," Schatt said. That may cause problems for many companies whose local-area networks do not provide much support for remote access, he added, much less the dynamic access requirements of a Newton (*NW*, April 19, page 1).

Schatt said net managers "will have to look to network operating system vendors to supply some missing links, to provide some better hooks" in order to connect PDAs and personal communicators into traditional corporate nets. Directory services specifically designed to support mobile workers will be a key element, he said.

Multitudes of PDAs accessing corporate networks will also affect the architecture of corporate networks, creating hierarchies of servers. Users could end up with enterprise servers, departmental servers, desktop or personal servers, and portables, said Pieter Hartsook, editor of The Hartsook Letter, an Apple-related research service in Alameda, Calif.

"It's the same kind of issues you have with notebooks," Hartsook said, "only much more so." With all those layers, he asked, how do you determine the current version of a given file?

An Apple spokesperson acknowledged that network managers have not yet had to deal with issues such as roving peripherals, making connections on the fly and a multitude of different network connections. Newton promises to change all that.

Fortunately, it's not too late. "Network managers are lucky in that the market is in a very formative stage," agreed Jeffrey Henning, a senior industry analyst with BIS Strategic Decisions in Norwell, Mass. "It's going to be a while before [PDAs] become ubiquitous," he said, and that will give network managers time to consider their options.

While initial users will rely on E-mail connections, as prices for send/receive facsimile modems continue to drop, ease of use will eventually make faxes the communications medium of choice for PDA users, according to Henning.

In the meantime, he said, network managers should concentrate on staying current with the technology. They may also want to deploy pilot programs for Newton connectivity. In the beginning, these pilots may be better suited for warehouse and retail environments rather than traditional offices.

According to InfoCorp's Schatt, companies can ease ad hoc networking by improving lighting for reading PDAs in meeting rooms and may even want to install network printers in conference rooms so users can make hard copies of files during meetings.

And network managers must be ready to deal with security concerns, both electronic and physical. Apple is already working on security issues in its Apple Open Collaboration Environment (*NW*, July 5, page 6), but Schatt suggested that managers check their wireless networks to make sure that outsiders cannot eavesdrop. Some facilities may need to install special shielding to prevent the signal from escaping. In extreme cases, he said, users may even bar remote access to sensitive data.

But with Newton's small size, electronic security is not enough. "There's a tendency for people to leave [PDAs] on their desks, where they are highly susceptible to theft," Schatt said. "That will [also] be an issue."

©Apple: (408) 996-1010.

What's in a Newton?

The Apple Computer, Inc. MessagePad line of Newton Personal Digital Assistants will go a long way toward making electronic communications easier and more ubiquitous.

Powered by a 32-bit ARM Systems 610 Reduced Instruction Set Computing processor, the MessagePad offers 640K bytes of random-access memory, with about 192K bytes available for data storage. Additional RAM can be added via the device's Personal Computer Memory Card International Association (PCMCIA) Type II slot.

Apple is expected to offer 1M- and 2M-byte cards, while other companies may sell cards holding up to 20M bytes. The MessagePad will use 4M bytes of read-only memory to store the operating system and some applications.

The hand-held device does not have a keyboard or mouse. Instead, it has a 4 in.-by-3 in. touch-sensitive screen. Users control the system with a plastic stylus or even their finger. The MessagePad features a limited degree of handwriting recognition, but beta testers have criticized this capability as not ready for prime time.

A built-in infrared connection will allow links to other MessagePads — and eventually desktop computers, as well — at distances up to about one meter. A serial port will allow wired connections to networks, printers, modems and other computers.

The PCMCIA slot can be used for additional connectivity options. And spread-spectrum radio wireless communications options are said to be in the works at Apple.

The unit is designed to run for several days on four AAA batteries. It includes an AC adapter and spare battery pack.

BY FREDRIC PAUL

Rollout

Continued from page 1

Analysts were more optimistic. "Having APPN on the 3172 removes the 3745 albatross that's been hanging around users' necks for years," said Tom Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J. "Users can bring their LANs to the mainframe and use APPN without a 3745 in sight. That's a major step forward for SNA users."

APPN on the 3172 will also let users on separate LANs linked to the controller communicate as peers without having to go through the mainframe or a FEP as they do today, said Thomas Routt, president of the Vedacom Corp. consultancy in Seattle.

Users were divided over the 3172 vs. FEP issue. SNA users looking at linking LANs to the mainframe said the 3172 is now the box of choice.

"Adding APPN to the 3172 is a great move, because it will let multiprotocol LANs participate fully in an APPN network," said Lionel Geltman, assistant vice president at Nomura Research America, a financial services firm in New York.

Users with lots of wide-area Synchronous Data Link Control lines were skeptical that 3172s could replace full-blown 3745s.

"We'd have to take a real hard look at anything proposing to take the place of our central 3745s," said Paul Dolbec, director of distributed equipment at Unum Life Insurance Co. in Portland, Maine. "It's a good idea, but I'd have to say it's too good to be true at this point."

Maybe not.

With dLUR on the 6611, Communications Manager/2 and the 3172 — along with the 3174 that already supports it — users will be able to bring in 3270 traffic from anywhere in their enterprise and have those devices participate fully in APPN nets, analysts said.

That, coupled with APPN on the 3172, presents a number of new options for supporting traditional 3270/SDLC traffic. For example, users could terminate SDLC lines in their data center at an SDLC-to-Logical Link Control 2 converter.

The 3270 traffic could then travel across a Token-Ring LAN to a 3172 and on to the mainframe. When the 3172 is configured as an NN, remote 3270s will be able to access resources anywhere in the enterprise without involving a mainframe or the FEP. Likewise, the dynamic configuration capabilities of APPN will be applied to 3270 devices under that scenario.

IBM's Munn said the company will also incrementally extend the APPN architecture by adding HPR to all of its APPN-capable products. The 3172 and 3174 controllers, along with the 6611 router, will get HPR first, with VTAM, RISC System/6000 and the Application System/400 soon after. Communications Manager/2 will be last in line to receive HPR, which is expected in late 1994.

IBM networking unit may avoid financial hit

Facing another round of severe cutbacks, IBM is still holding onto its Networking Systems group as one cog that will eventually get the Big Blue machine going again.

IBM last week announced a second-quarter loss of $8.04 billion and said an additional 35,000 jobs would be cut in the coming year. By the end of 1994, IBM will have a work force of about 225,000 people, down from a high of 405,000 in 1985.

Louis Gerstner, IBM's chairman, said he believes these latest cuts should be the last ones IBM needs. "What IBM needs now is a series of tough-minded, market-driven, highly effective strategies in each of its businesses," he said.

According to analysts, the latest results show that IBM is still trying to survive on falling hardware margins while it attempts to increase software revenue. It is also struggling to define new markets that it can attack aggressively, many of which analysts said fall into the Networking Systems realm.

"IBM's new leadership sees that networking and Networking Systems ties IBM together," said Sam Albert, president of Sam Albert Associates, an independent consulting firm in Scarsdale, N.Y. "It is clear that IBM will do whatever it can to keep networking part of its grand strategy in the future."

Albert noted that IBM's priorities right now are helping build a national high-speed digital highway, developing Asynchronous Transfer Mode (ATM) products and continuing to ramp up support for multimedia applications.

"IBM has healthy investments in all of those technologies right now," Albert said. "Gerstner is behind all of them, too."

Gerstner singled out ATM technology at a press conference last week, saying it was imperative that IBM gain a stronghold in that area.

Analysts said IBM also has a large stake in the client/server market and other enabling network technologies, such as its Advanced Peer-to-Peer Networking and Advanced Program-to-Program Communications.

"Nothing right now will stop IBM from investing in new networking technology areas," said Frank Dzubeck, president of Communications Network Architects, Inc., an independent consultancy in Washington, D.C. "Where you will see cutbacks is in areas where development was mainframe-centric."

Other analysts agreed, saying areas such as IBM's CallPath, which defines how IBM processors link to private branch exchanges, will be left out in the cold. IBM's Open Systems Interconnection development has also seen a dramatic decrease in funding, analysts said.

According to Anura Guruge, an independent strategic analyst in New Ipswich, N.H., "All of the layoffs and shifting priorities have to be a distraction, but how that will manifest itself — in product delays or delayed strategic decisions — isn't really clear.

"I don't think that any part of IBM's business is safe from the ax at the moment," he added.

BY MICHAEL COONEY

IBM to boost internet wares

IBM is expected to enhance its internetworking lineup this fall by announcing a more powerful 6611 router and support for TCP/IP and IPX traffic in its LAN-to-LAN Wide Area Network (LLW) program.

The new 6611 will be at least twice as powerful as the current top-of-the-line 6611 Model 170. Sources say the new 6611, which may be called the Model 190, will use new Reduced Instruction Set Computing-based processors to get more throughput.

Currently, the 6611's throughput is about 4,600 packet/sec for 64-byte frames. Sources said IBM will easily double that with the new router.

IBM acknowledged that it was working on a faster 6611 and said it will also improve performance by off-loading functions such as Transmission Control Protocol/Internet Protocol or AppleTalk processing from the main customer premises equipment onto new communications cards inside the router. IBM declined to give further details.

Sources indicated that the Model 190 could also support more communications slots, possibly 10 or 12, for local- and wide-area connectivity. The current Model 170 supports seven slots, each of which can support one Token-Ring or Ethernet connection. IBM is also expected to increase the number of Synchronous Data Link Control lines supported from the current maximum of 24 19.2K or 12 64K bit/sec lines.

"This box won't be a whole new beast, but rather a natural evolution of the 6611," said Frank Dzubeck, president of the Communications Network Architects, Inc. consultancy in Washington, D.C. "Users have been asking for it, and IBM will deliver it late this year or in early 1994."

Systems Network Architecture users have also been asking for better ways to link local-area networks to their backbones, and IBM will appease them by adding TCP/IP and Novell, Inc.'s Internetwork Packet Exchange (IPX) support to its OS/2-based LLW program. LLW lets users employ their SNA nets as a means of linking remote LANs.

Currently, LLW lets Network Basic I/O System-based communications flow over SNA links by encapsulating NETBIOS traffic in LU 6.2 sessions. Now Novell NetWare and TCP/IP data will be added to the mix.

"[LLW] lets any SNA user with branch or regional offices containing LANs use the existing backbone to communicate with each other," said Raymond High, president of Computer Communications, Inc. (CCI). CCI sells the Eclipse 7020 router, which lets users send IPX or TCP/IP traffic over SNA backbones and will compete directly with the new IBM product. "We have heard that the IBM product is coming, but we haven't seen any details yet."

Sources indicated that the improved IBM LLW product will be available by the end of the year.

BY MICHAEL COONEY

Calendar

Continued from page 1

lease by year end a Novell, Inc. NetWare version of its OnTime group calendaring product that supports DOS, Microsoft Corp. Windows and Macintosh clients. OnTime, which does not run on top of E-mail as do many other group scheduling products, is already offered in a version that runs on interconnected Banyan Systems, Inc. VINES servers.

All this activity is good news for group scheduling users and vendors, said John Hitchins, president of Powercore.

"Users are starting to look at group scheduling as an enterprise application, as they do with their electronic mail," he said.

Version 2.0 of Powercore's Network Scheduler 3 product fits under the umbrella of the company's new Time Services Architecture. The architecture details how so-called time-centric information — appointments and other data stored on group scheduling systems — will be available in a diverse computing environment.

"Our goal is to have a cross-platform product that puts time-centric information where the user needs it," said Carl Melville, vice president of marketing at Powercore, which rolled out the first version of Network Scheduler 3 about a year ago.

Version 2.0 advances that vision by adding Macintosh client support to the product's existing Windows and DOS client support. Support for OS/2 and Unix clients is also on the way.

In addition, the product now supports VIM and Microsoft's Messaging Application Programming Interface, which means it will work with any E-mail system supporting those specifications.

Network Scheduler 3 uses the mail systems to transport calendar updates and interserver traffic.

Powercore's product also synchronizes its directory with that of the underlying mail system so changes in the mail directory are reflected automatically in the Network Scheduler 3 directory.

That is a big plus for net administrators, said Bob Rustici, an analyst with Groupware Solutions, Inc., a Pepperell, Mass., consulting firm. "Users are resistant to adding new directory systems to their networks because it can be a maintenance nightmare," he said.

JOHN THOMPSON

Powercore's Carl Melville

Powercore will also make available its API so developers can integrate applications with the group calendaring/scheduling software.

Version 2.0 will begin shipping Oct. 1 at $495 for a five-user pack. Upgrade pricing will be announced later.

©Powercore: (815) 468-3737.

Senior Editor Wayne Eckerson contributed to this article.

Integration

Continued from page 1

software that enables an SNA backbone to be used to ferry multiprotocol traffic between remote LANs.

Finally, IBM is touting its Advanced Peer-to-Peer Networking as technology that will eventually be used to support not only SNA data, but virtually any kind of traffic.

Utility giants Boston Edison Co. and Georgia Power Co. have subscribed to the first technique. Both are consolidating legacy SNA traffic onto an internet backbone using Synchronous Data Link Control-to-Logical Link Control 2 (LLC2) conversion technology.

DUBIEL

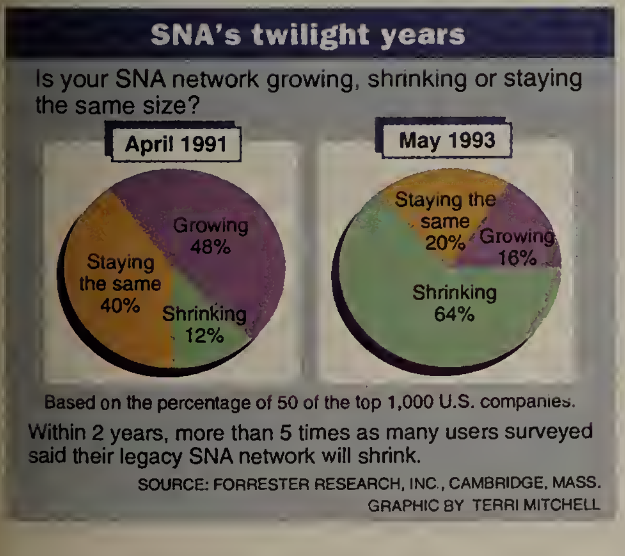
Previously, Georgia Power's network consisted of 5,600 IBM dumb terminals attached to 3174 cluster controllers in more than 200 remote sites, said Brent Taylor, senior information technology engineer at the company.

The 3174s were linked via multidrop SDLC lines to 3725 front-end processors (FEP) in Georgia Power's Atlanta headquarters.

The 3725s, in turn, were linked via SDLC trunks to a 3725 FEP and two mainframes 30 miles away at parent Southern Co.'s headquarters, which is also in Atlanta.

Three years ago, the company began a large-scale deployment of Novell, Inc. NetWare-based token-ring LANs in its headquarters and remote sites to support applications such as electronic mail, file sharing and Lotus 1-2-3.

The sites are interconnected to each other and to the host site via Wellfleet Communications, Inc. routers that support Novell's Internetwork Packet Exchange (IPX) and a smattering of TCP/IP and AppleTalk data.



SNA's twilight years

Is your SNA network growing, shrinking or staying the same size?

Based on the percentage of 50 of the top 1,000 U.S. companies.

Within 2 years, more than 5 times as many users surveyed said their legacy SNA network will shrink.

SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.
GRAPHIC BY TERRI MITCHELL

In a first step toward merging the SNA and internet backbones, Taylor deployed 22 Sync Research, Inc. SDLC converters to replace the 3725 remote FEPs in Georgia Power's headquarters. Dubbed the SNA Network Access Controller (SNAC)/Token Ring Concentrator (TRC), the Sync device converts SDLC data coming from the remote 3174s into an LLC2 format that can be carried across a LAN internet to an IBM host.

Taylor said the converters are protecting Georgia Power's investment in legacy 3174 equipment while he works toward replacing 3270 terminals with PCs and LAN-attached workstations.

"Our 3725s weren't going to be supported by IBM as far as upgrades, and we were also getting into LAN internetworking in a big way. We saw this as a way to save significantly on equipment costs," he said.

Taylor has saved at least $500,000 by deploying 22 Sync converters instead of new IBM 3745 FEPs.

POWER OF CONVERSION

Boston Edison has enjoyed similar benefits by employing SDLC conversion technology. But the energy utility company, which services homes and businesses throughout eastern Massachusetts, is witnessing even greater savings on its wide-area network costs than its Southern counterpart because it performs the SDLC-to-LLC2 conversion at the company's remote sites.

Boston Edison's SNA net consisted of 40-plus IBM 3174 controllers dispersed throughout the 17 remote sites and another 20-plus at the central data center in Boston. In total, the 3174s support more than 1,000 3270 terminals and printers.

Two years ago, the company decided to merge its SNA net and newly constructed internet, based on Proteon, Inc. routers, onto a single backbone. In order to accomplish that, Boston Edison installed Netlink, Inc. SDLC Link Servers at each of its remote sites.

SNA traffic from the 3174s now feed into the SDLC Link Server, which converts it to an LLC2 format and sends it to the mainframe over the internetwork.

John Dubiel, manager of planning and technology at Boston Edison, estimates that the company is saving an average of $300 per month per site by eliminating a passel of 9.6K and 19.2K bit/sec wide-area SDLC lines. Dubiel said those savings would be even larger for a user whose mainframe and SDLC devices span greater distances.

Boston Edison also replaced its 3725 FEP with an IBM 3172 Interconnect Conroller, which channel-attaches LANs to a mainframe.

Dubiel said this has resulted in a $20,000-per-year savings in FEP maintenance costs because the 3172 does not require the costly upkeep of Network Control Program generations, which were necessary with the 3725.

The SDLC conversion method does have its limitations, however. Principally, it uses source route bridging, an algorithm that relies heavily on broadcasts to choose its routes, which could overwhelm wide-area links and lead to serious congestion problems in large networks.

Dubiel, however, said his net is small enough that the broadcasts have not been a problem. ☒

1-2-3 approach

Continued from page 1

tem/6000 Unix processor and a Sybase, Inc. SQL Server database on the same RS/6000.

UBS' client/server challenges

1 **Learning curve:** Technical staff had no prior knowledge of Unix, C, SQL or Powersoft Corp.'s PowerBuilder.

2 **Network design:** UBS couldn't find a modelling tool that could calculate bandwidth demand from client/server applications.

3 **Network management:** Lack of tools for managing software, hardware and network components from a single console.

4 **Response time:** Maintaining sub-five second response time for all applications.

SOURCE: UNITED BEHAVIORAL SYSTEMS, INC., MINNEAPOLIS
GRAPHIC BY SUSAN J. CHAMPENY

The PowerBuilder GUI provides access to the functionality servers and SQL Server database C subroutines via remote procedure calls (RPC) generated by a high-level tool from Open Environment Corp. (OEC) in Cambridge, Mass.

The OEC tools currently generate proprietary RPCs but will soon support industry-standard RPCs from Open Software Foundation, Inc. that UBS plans to implement.

The architecture will initially support a patient administration system called STEPS and a provider credentialing system called ProvNet that will be accessed by employees using 486 personal computers on Novell, Inc. NetWare local-area networks. Cisco Systems, Inc. routers on the NetWare LANs will route traffic across 56K bit/sec or T-1 links to a campus network here on which the RS/6000 resides.

The RS/6000 will also be able to request data from several legacy applications on IBM and Unisys Corp. mainframes, also on the campus network, that are maintained by UBS' parent company, United HealthCare Corp.

According to Schmidt, the traditional two-tiered approach to client/server applications can quickly overload both clients and servers, requiring companies to upgrade to more powerful and expensive machines.

It also makes it more difficult to change or modify application code or migrate it to another platform since that code is closely integrated with a platform-specific database or GUI.

The three-tier approach eliminates these bottlenecks and gives users greater flexibility to port application logic to a separate processor or evenanother platform as the application or number of users expands.

In addition, since the application code consists of independent blocks of code that can run on one or multiple processors, it can be modified without affecting other parts of the application, according to Pete Meidl, UBS project leader.

The three-tiered architecture has allowed UBS to code its entire application logic as a series of independent C subroutines or functions, such as "Get patient name," that can be executed by the OEC RPCs. UBS can add or change individual C subroutines without affecting any other subroutine or having to modify the GUI or database server, Schmidt said.

UBS is now looking to build an encyclopedia of C functions so developers can easily identify C subroutines that they can reuse in future applications. "This gives us reusability and modularity with standard C and SQL code," Schmidt said.

He added that building applications as modular blocks of C code will make it easier for UBS sister companies and even outside firms, such as insurance providers, to tap into the STEPS or other UBS applications to more efficiently share information.

CHALLENGES

While UBS expects to reap many benefits from client/server computing, it has run into obstacles. First, its technical staff of COBOL programmers had no knowledge of C, SQL, PowerBuilder or Unix.

"The greatest risk in undertaking this project was our lack of expertise," said Schmidt, who put his staff through several week-long training courses in the different technologies to overcome this hurdle.

More intransigent obstacles revolved around the lack of commercially available tools for designing and managing a client/server network.

Schmidt said there were not any tools available a year ago that could model network traffic generated by client/server applications.

Consequently, UBS was forced to make its own projections about the size and number of packets that different application functions would send across the network. "We basically took an educated guess," he said.

In addition, since UBS could not find a management tool that could centrally monitor and manage all the hardware, software and network components of its client/server network, it spent many man-hours trying to track down the source of outages.

"Initially, when something went wrong, we didn't know if it was being caused by the Sybase database, the RS/6000, the LAN, the GUI, the routers or other things," said Al Hite, a systems analyst at UBS. "We had to check each item separately, and that took a lot of time and people."

Through trial and error, UBS staffers can now quickly identify problems once they occur, Schmidt said, but they have no tools for proactively detecting problems and averting slowdowns or crashes.

"It would be nice to address problems before they arrive, instead of waiting for users to call up and say their response time is terrible," Schmidt said. ☒

NETWORK WORLD

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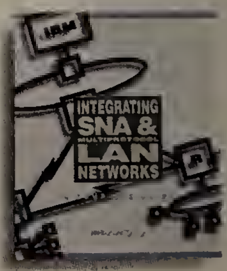

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When Your Networks Are Complex, Your Choice Is Simple.℠

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